Objective MCQs

LECTURER

Asstt./Associate Professor

Subject Specialist

Selection Procedure &
Fully Solved MCQs Papers

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LECTURER

SUBJECT SPECIALIST

Recruitment Test Guide

PHYSICS

Salient Features:

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Subject Based Test
(80 Marks)

General Ability Test
(20 Marks)

With Expected Questions For Coming Exams.

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Selection Procedure

PUNJAB PUBLIC SERVICE COMMISSION, LAHORE

ADVERTISEMENT NO.24/2020

PUNJAB HIGHER EDUCATION DEPARTMENT

LECTURER (FEMALE) (BS-17) ON REGULAR BASIS

CASE NO.	SUBJECT	OPEN MERIT POSTS	MINORITY QUOTA	SPECIAL PERSON QUOTA	TOTAL POSTS
01-RB/2020	ARABIC	13	0	0	13
02-RB/2020	BIOLOGY	47	2	1	50
03-RB/2020	BOTANY	15	0	0	15
04-RB/2020	CHEMISTRY	92	5	3	100
05-RB/2020	COMMERCE	15	0	0	15
06-RB/2020	COMPUTER SCIENCE	56	3	1	60
07-RB/2020	ECONOMICS	65	3	2	70
08-RB/2020	EDUCATION	74	4	2	80
09-RB/2020	ENGLISH	184	10	6	200
10-RB/2020	FINE ARTS	6	0	0	6
11-RB/2020	GEOGRAPHY	19	1	0	20
12-RB/2020	HISTORY	24	1	0	25
13-RB/2020	HOME ECONOMICS	70	3	2	75
14-RB/2020	ISLAMIAT	78	0	2	80
15-RB/2020	JOURNALISM	6	0	0	6
16-RB/2020	LIBRARY SCIENCE	15	0	0	15
17-RB/2020	MATHEMATICS	74	4	2	80
18-RB/2020	PAK STUDY	10	0	0	10
19-RB/2020	PERSIAN	10	0	0	10
20-RB/2020	PHILOSOPHY	3	0	0	3
21-RB/2020	PHYSICAL EDUCATION	92	5	3	100
22-RB/2020	PHYSICS	74	4	2	80
23-RB/2020	POLITICAL SCIENCE	47	2	1	50
24-RB/2020	PSYCHOLOGY	56	3	1	60
25-RB/2020	PUNJABI	20	0	0	20
26-RB/2020	SARAIKI	7	0	0	7
27-RB/2020	SOCIAL WORK	10	0	0	10
28-RB/2020	SOCIOLOGY	19	1	0	20
29-RB/2020	STATISTICS	47	2	1	50
30-RB/2020	URDU	84	4	2	90
31-RB/2020	ZOOLOGY	15	0	0	15
	Total	1347	57	31	1435

LECTURER (MALE) (BS-17) ON REGULAR BASIS

CASE NO.	SUBJECT	OPEN MERIT POSTS	MINORITY QUOTA	SPECIAL PERSON QUOTA	TOTAL POSTS
32-RB/2020	ARABIC	8	0	0	8
33-RB/2020	BIOLOGY	19	1	0	20
34-RB/2020	BOTANY	8	0	0	8
35-RB/2020	CHEMISTRY	84	4	2	90
36-RB/2020	COMMERCE	29	1	0	30
37-RB/2020	COMPUTER SCIENCE	37	2	1	40
38-RB/2020	ECONOMICS	47	2	1	50
39-RB/2020	EDUCATION	37	2	1	40
40-RB/2020	ENGLISH	121	6	3	130
41-RB/2020	GEOGRAPHY	18	0	0	18
42-RB/2020	HISTORY	24	1	0	25
43-RB/2020	ISLAMIAT	49	0	1	50
44-RB/2020	JOURNALISM	5	0	0	5
45-RB/2020	LIBRARY SCIENCE	5	0	0	5
46-RB/2020	MATHEMATICS	92	5	3	100
47-RB/2020	PAK STUDY	7	0	0	7
48-RB/2020	PERSIAN	5	0	0	5
49-RB/2020	PHILOSOPHY	3	0	0	3
50-RB/2020	PHYSICAL EDUCATION	47	2	1	50
51-RB/2020	PHYSICS	70	3	2	75
52-RB/2020	POLITICAL SCIENCE	29	1	0	30
53-RB/2020	PSYCHOLOGY	19	1	0	20
54-RB/2020	PUNJABI	10	0	0	10
55-RB/2020	SARAIKI	5	0	0	5
56-RB/2020	SOCIAL WORK	5	0	0	5
57-RB/2020	SOCIOLOGY	15	0	0	15
58-RB/2020	STATISTICS	56	3	1	60
59-RB/2020	URDU	92	5	3	100
60-RB/2020	ZOOLOGY	12	0	0	12
	Total	958	39	19	1016

MINIMUM QUALIFICATION / EXPERIENCE

MASTER'S DEGREE (AT LEAST 2ND DIVISION) IN THE RELEVANT SUBJECT OR EQUIVALENT QUALIFICATION, PROVIDED THAT FOR THE SUBJECT OF ENGLISH M.A 3RD DIVISION WITH DIPLOMA IN ENGLISH FROM ALLAMA IQBAL OPEN UNIVERSITY WILL ALSO BE ELIGIBLE.

NOTE:-

In case a candidate claims that his/her qualification is equivalent to the prescribed qualification, he/she will be required to submit equivalence of his/her qualification issued by the Competent Authority at the time of interview. If a candidate fails to submit Equivalence Certificate issued by the Competent Authority at the time of interview his/her candidature shall be cancelled.

AGE

FEMALE

21 to 28 + 08 Years General age relaxation in upper age limit for FEMALE Candidates = 36 Years as per Govt. of Punjab, S&GAD Notification No. SOR-I (S&GAD) 9-36/81 dated 21-05-2012.

MALE

21 to 28 + 05 Years General age relaxation in upper age limit for MALE Candidates = 33 Years as per Govt. of Punjab, S&GAD Notification No. SOR-I (S&GAD) 9-36/81 dated 21-05-2012.

GENDER, DOMICILE & PLACE OF POSTING

GENDER:
Male & Female

DOMICILE:
Punjab

PLACE OF POSTING:
Anywhere in the Punjab

SYLLABUS FOR WRITTEN EXAMINATION/ TEST (IF HELD)

One paper of MCQ type written test of 100 marks and 90 minutes duration. Syllabus is as under:-

i) Qualification related questions (80%)

ii) Questions related to General Knowledge (20%)

IMPORTANT NOTE

Please read the "General Instructions" regarding Application Fee, Written Test, Interview on PPSC website www.ppsc.gop.pk before applying online.

CLOSING DATE FOR APPLICATIONS: 8th September 2020

MUHAMMAD NAWAZ KHALID ARBI
SECRETARY

UAN NO. 042-111-988-722 website: www.ppsc.gop.pk

Syllabus & Distribution of Marks:

Total MCQs = 100 **Time : 90 minutes**

Subject Based Test = 80 % **General Ability Test = 20%**

One Paper of MCQ type written test of 100 marks of 90 minutes duration comprising questions relating to Qualification of the Post and General Knowledge incuding Pakistan Studies, Current Affairs, Islamic Studies, Geography, Baisc Mathematics, English, Urdu, Everyday Science and Basic Computer Studies.

GENERAL INSTRUCTIONS (WRITTEN TEST/INTERVIEW)

1. **To appear in test/interview only Original Valid CNIC issued by NADRA will be accepted. No other identification document will be acceptable.**
2. Applicants are advised to read all terms and conditions/ Instructions of the Advertisement as well as **"Important/General Instructions to Candidates" given on PPSC website** carefully in order to submit their Online Applications complete in all respects. The onus/ responsibility of correctness of the data given in the On-line Application Form will rest squarely on the candidates.
3. Applicants are required to submit **"On-line Application Form" by the Closing Date which is 08-09-2020 up to 12:00 AM (Midnight).** Applicants should fill in the On-line Application Form carefully in the light of the Guidelines and Instructions mentioned in the Advertisement for the said post and **"Important/General Instructions to Candidates".**
4. Editing options, to correct any data in the On-line Application Form, will be available to the candidates till the Closing Date of submission of Online Applications.
5. Negative marking shall be done and 0.25 mark shall be deducted for each incorrect answer in all Objective (MCQ) papers.
6. For all posts to be filled through written test followed by interview or interview alone, the number of chances shall be restricted to three. However, if a candidate qualifies the interview but cannot be recommended for appointment due to shortage of vacancies, his chance shall not be considered as availed whereas chance of a candidate who does not qualify the written test or interview shall be considered as availed. For the post of Lecturer in Education Department, a candidate who is applicant for more than one subject, shall be allowed three chances in each subject for which he/she is a candidate in accordance with above laid down policy.
7. In case, a candidate claims experience of private firm / entity, he / she must bring proof at the time of interview that the firm / entity is registered with SECP, Registrar of Firms or any other Regulatory Authority, failing which his / her application shall be rejected.
8. The candidates will ensure that after applying for a particular post they will immediately apply for Departmental Permission Certificate/NOC in their concerned Department(s) and provide the Departmental Permission Certificate/NOC at the time of interview (if called).
9. The candidates just after applying for a particular post advertised by PPSC will ensure that they have obtained/applied for registration in PEC/PNC/PMDC/PVMC or other relevant body for Registration Certificate before the Closing Date and provide the same at the time of interview (if called).
10. The candidates will ensure that they will provide marks obtained / total marks or percentage certificate of all degrees at the time of interview. CGPA is not acceptable.
11. It is mandatory for Applicants to deposit **Rs.600/-** under Head:"C02101- ORGANIZATIONS OF STATE-TEST FEE REALIZED BY THE PUNJAB PUBLIC SERVICE COMMISSION", in any Branch of State Bank of Pakistan or National Bank of Pakistan or Government Treasury on or before the Closing Date of submission of applications
    - In case, the requisition of any post is withdrawn by the Administrative Department after receipt of applications by the Commission, the candidates of that particular post can use Paid Treasury Challan of the withdrawn post against any other post (Once), advertised by the Commission within the next One Year.
    - Special Persons are not required to deposit application fee.
    - **Applicants residing outside Pakistan, but having Domicile of the Punjab will deposit the fee at the Pakistani Embassy of residing country in the currency of that country equivalent to the amount of Application/ Test Fee prescribed for the post.**
    - **No Bank Draft or Pay Order or Cheque or any such instrument will be accepted as fee by the Commission.**
12. PPSC's Helplines: Lahore: 042-99202762, 99200161, 99200162, Rawalpindi: 051-5158095, Faisalabad: 041-9330713, Sargodha: 048-3259710, Multan: 061-9330354, Bahawalpur: 062-2881182, D.G. Khan: 064-9260410

FORMULA TO CALCULATE ACADEMIC MARKS IN PPSC

PERCENTAGE OF MARKS OBTAINED (SEMESTER SYSTEM)	PERCENTAGE OF MARKS OBTAINED (ANNUAL SYSTEM)	4-EXAMS					3-EXAMS				2-EXAMS			1-EXAM	
		MATRIC/ O-LEVEL	FA/FSc/ A-Level	BA/ BSc.	MA/ MSc.	TOTAL	MATRIC/ O-LEVEL	FA/FSc/ A-Level	BA/ BSc.	TOTAL	MATRIC/ O-LEVEL	FA/FSc/ A-Level	TOTAL	MATRIC/ O-LEVEL	TOTAL
90-100	80 & ABOVE	5	7	11	17	40	9	12	19	40	15	25	40	40	40
80-89	75-79	5	7	10	16	38	9	11	18	38	14	24	38	28	28
75-79	70-74	5	6	10	15	36	8	11	17	36	13	23	36	36	36
70-74	65-69	4	6	10	14	34	8	10	16	34	12	22	34	34	34
65-69	60-64	4	6	9	14	33	7	10	16	33	11	22	33	33	33
60-64	55-59	3	5	9	13	30	6	9	15	30	10	20	30	30	30
55-59	50-54	3	5	9	11	28	6	9	13	28	9	19	28	28	28
50-54	45-49	3	5	8	10	26	5	8	13	26	8	18	26	26	26
45-49	40-44	3	5	8	9	25	5	8	12	25	8	17	25	25	25
44 & BELOW	39 & BELOW	3	5	7	9	24	5	8	11	24	7	17	24	24	24

Note: In a case a candidate has appeared in five exams, his/her last four examinations will be marked. No marks for BEd or M.Ed

Note: Qualifying marks for written test (MCQs) and Interview:

(A) at least 40% marks in written test to qualify for interview.

(B) at least 50% marks in interview to clear interview.

In final merit, only 50% of written marks are taken.

EQUIVALENCE OF QUALIFICATIONS FOR THE POSTS OF LECTURERS (MALE & FEMALE) IN THE EDUCATION DEPARTMENT

SR.NO.	NAME OF THE SUBJECT	REQUISITE QUALIFICATION / EQUIVALENCE DEGREES
1	Arabic	2nd Class Master's Degree in Arabic Ashahdat-ul-Alimiyyah Fil Uloomil Arabiyyah Wal Islamiyyah
2	Civics	2nd Class Master's Degree in Civics Pol. Science.
3	Islamiat	2nd Class Master's Degree in Islamiat Islamic Studies Islamic Culture & Religion Ashahdat-ul-Alimiyyah Fil Uloomil Arabiyyah Wal Islamiyyah B.A. (Hons.) Usul-ud-Din
4	Biology	2nd Class Master's Degree in Biology Botny or Zoology with B.Sc. in both will be acceptable MicroBiology and Molecular Genetics Marine Biology Freshwater Biology and Fisheries Genetics M.Sc. Biology (Plant Sciences) M.Sc. Biology (Animal Sciences) M.Sc. Botany BS Botany M.Sc. Zoology BS Zoology BS / B.Sc. (Hons.) Biotechnology BS / B.Sc. (Hons.) Biochemistry BS (Hons.) in Environmental Science B.Sc. (Hons.) Bioinformatics
5	Botany	2nd Class Master's Degree in Botany Entomology Plant Breeding & Genetics Mycology & Plant Pathology. M.Sc. Biology (Plant Sciences)
6	Zoology	2nd Class Master's Degree in Zoology Entomology Plant Breeding & Genetics Mycology & Plant Pathology M.Sc. Biology (Animal Sciences)
7	Chemistry	2nd Class Master's Degree in Chemistry Applied Chemistry Bio-Chemistry M.Sc. (Industrial Chemistry)
8	Computer Science	2nd Class Master's Degree in MS (CS) M.Sc. Logic & Computer Science MCS MIT (Master's degree in Information Technology) M.Sc. Telecom MIS M.Sc. Software Engineering B.Sc. (Hons.) in Computer Science B.Sc. (Hons.) in Software Engineering B.Sc. (Hons.) in Information Systems
9	Economics	2nd Class Master's Degree in Economics M.Sc. Economics Business Economics M.Sc. Economics & Finance B.Sc. (Hons.) Agricultural & Resource Economics
10	Education	2nd Class Master's Degree in M.A. Education M.Ed. MBE

SR.NO.	NAME OF THE SUBJECT	REQUISITE QUALIFICATION / EQUIVALENCE DEGREES
		MTE M.A. ELTL M.A. ECE M.S.Ed M.A. Educational Assessment & Research
11	Commerce	2nd Class Master's Degree in Commerce M. Com. M.A. Finance M. S. Accounting & Finance M.S. Banking & Finance MBA Marketing MBA Finance
12	Geology	2nd Class Master's Degree in Geology M.Sc. Environmental Science M.Sc. Earth Science M.Sc. Seismology.
13	Home Economics	2nd Class Master's Degree in M.A. Home Economics M.Sc. Home Economics.
14	Journalism/Mass Communication	2nd Class Master's Degree in M.A. Development Journalism.
15	Pakistan Studies	2nd Class Master's Degree in Pakistan Studies History Political Science M.A. International Relations
16	Political Science	2nd Class Master's Degree in Political Science M.Sc. Political Studies. M.A. International Relations. M.A. Diplomacy & Strategic Studies Master in Politics and International Relations Master in Defense and Diplomatic Studies
17	Psychology	2nd Class Master's Degree in Psychology M.Sc. Applied Psychology M.Sc. Behavioral Science BS (Hons) Clinical Psychology
18	Physics	2nd Class Master's Degree in Physics M.Sc. Computational Physics
19	Physical Education	2nd Class Master's Degree in Physical Education M.A. Health & Physical Education M.Sc. Physical Education M.S.c Sports Science
20	Social Work	2nd Class Master's Degree in Social Work M.A. Women Studies M.A. Gender Studies M.A Population Studies M.A. Rural Sociology
21	Sociology	2nd Class Master's Degree in Sociology Rural Sociology M.Sc. Anthropology M.A. Sociology & Anthropology M.A. Women Studies M.A. Gender Studies M.A. Population Studies
22	Statistics	2nd Class Master's Degree in Statistics M.Sc. Operational Research.
23	Urdu	2nd Class Master's Degree in Urdu M.A. Iqbaliat / Iqbal Studies

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Guideline for the Post of Lecturer
لیکچرار کی پوسٹ کیلئے گائیڈ لائن

لیکچرار کی بھرتی کیلئے درخواست دینے والے امیدواران کی راہنمائی کیلئے چند ضروری معلومات اور ہدایات درج ذیل ہیں:

Department (محکمہ): HED (Higher Education Department) ہائر ایجوکیشن ڈیپارٹمنٹ

Scale (سکیل): (BS-17)

Eligibility (قابلیت): MA, M.Sc or BS in relevant subject (ایم اے/ ایم ایس سی یا متعلقہ مضمون میں بی ایس)

Age (عمر): 22-28 (5 years relaxation for males and 8-years for females)
مرد امیدواران کے عمر کی حد میں 5 سال اور خواتین کے لیے 8 سال کی رعایت

Procedure to Apply (اپلائی کرنے کا طریقہ کار):

1. See Advertisement in daily Newspapers or Visit to Punjab Public Service Commission. (روزنامہ اخبار یا PPSC کی ویب سائٹ www.ppsc.gop.pk پر اشتہار دیکھیں)
2. Deposit Rs. 600/- Challan in the prescribed bank. 600/- روپے کا چالان متعلقہ بنک میں جمع کروائیں۔
3. Apply online through PPSC website. PPSC کی ویب سائٹ پر آن لائن درخواست فارم جمع کروائیں۔
4. Select examination center i.e. Lahore, Rawalpindi, Multan etc. (امتحان مرکز لاہور، راولپنڈی، ملتان وغیرہ کا انتخاب کریں)

Selection Criteria (in any subject) کسی بھی مضمون میں انتخاب کا معیار:

Written MCQs Test (تحریری کثیر الانتخابی سوالات کا ٹیسٹ) = 100 Marks
(In final merit list, it will be half i.e.50) (فائنل میرٹ لسٹ میں اس کے آدھے نمبر ہو جائیں گے)
Interview (انٹرویو): = 100 Marks   **Academic (تعلیمی):** = 40 marks
Higher Qualification (اعلیٰ تعلیم): M.Phil, PhD = 10 Marks
Total Marks for final merit (حتمی میرٹ کے لیے کل نمبر) = 200

Syllabus (نصاب)

Qualification Based MCQs (تعلیمی بنیاد پر کثیر الانتخابی سوالات) = 80 Marks
Main Subject in which candidate did his/her BS or Master degree.
(جس مضمون کے لیے اپلائی کیا ہے اور جس میں امیدوار نے بی ایس یا ماسٹر کی ڈگری حاصل کی ہے)

General Ability (جنرل قابلیت): (20Marks)

(Basic English (بنیادی انگریزی), Current Affairs (حالات حاضرہ), General Knowledge (واقفیت عامہ), Pakistan Studies (مطالعہ پاکستان), Islamiat (اسلامیات), Basic Mathematics (ریاضی), Everyday Science (روزمرہ سائنس)

2 to 3 MCQs from each topic (ہر عنوان سے 2 یا 3 سوالات)

Total Marks = 80 + 20 = 100

عام طور پر سابقہ پرچہ جات میں سے سوالات لیے جاتے ہیں۔اس کے علاوہ انٹرمیڈیٹ، گریجویشن اور ماسٹر لیول کے نصاب میں سے MCQs لیے جاتے ہیں۔

Test Preparation (ٹیسٹ کی تیاری):

Interest, Determination and Hard work is required (دلچسپی، لگن اور سخت محنت کی ضرورت ہے)

روزانہ پڑھنے کا شیڈول بنالیں۔ میٹرک، انٹرمیڈیٹ، گریجویشن اور ماسٹر لیول کی کتب سے تیاری کریں۔ Simple (سادہ) سے Complex شکل کی جانب جائیں۔ اہم نکات کو Highlight کرلیں۔ علیحدہ رجسٹر پر نوٹس بنائیں۔ ماڈل پیپرز حل کریں۔ اپنی نصابی کتب سے استفادہ کریں۔ 100 فیصد یقینی کامیابی کے لیے درج ذیل کتب کا مطالعہ کریں:

1. **Dogar's Unique Lecturer Guides** (تمام مضامین کی الگ الگ کتب دستیاب ہیں)
2. **Dogar's Unique Model / Sample Papers** (تمام مضامین کے الگ الگ پیپرز دستیاب ہیں)
3. **Dogar's Unique PPSC One-Paper MCQs**
4. **Dogar's Unique PPSC Past Papers**
5. **Dogar's Unique Who is Who & What is What**

پنجاب پبلک سروس کمیشن

اُمیدواروں کے لیے ضروری ہدایات

براہِ مہربانی اپنا آن لائن درخواست فارم جمع کروانے سے پہلے کمیشن کا اشتہار اور مندرجہ ذیل ہدایات غور سے پڑھیں۔

اشتہار

1۔ اُمیدواروں کو ہدایت کی جاتی ہے کہ وہ ہر لحاظ سے مکمل آن لائن درخواستیں جمع کروانے کے لیے اشتہار میں دی گئی تمام شرائط وضوابط و عمومی ہدایات غور سے پڑھیں۔ آن لائن درخواست میں دیے گئے کوائف کی درستگی کی تمام تر ذمہ داری اُمیدوار پر ہوگی۔

فیس

2۔ اُمیدواروں کے لیے ضروری ہے کہ وہ اشتہار میں بیان کی گئی مطلوبہ فیس: "سی 02101 – سٹیٹ آرگنائزیشن-پنجاب پبلک سروس کمیشن کی جانب سے وصول کردہ امتحانی فیس" کی مد میں سٹیٹ بینک آف پاکستان یا نیشنل بینک آف پاکستان یا سرکاری خزانے میں درخواستوں کی وصولی کی آخری تاریخ سے پہلے جمع کروائیں۔

الف۔ رسید نمبر اُمیدواروں کے آن لائن درخواست فارم میں درج کیا جائے گا۔

ب۔ اصل رسید انٹرویو/زبانی امتحان کے وقت پیش کی جائے گی اور جمع کروائی جائے گی اور ایسا نہ کرنے کی صورت میں اُمیدواروں کو انٹرویو/زبانی امتحان دینے کی اجازت نہیں دی جائے گی۔ اصل رسید پی پی ایس سی اپنے پاس ریکارڈ کے لیے رکھے گا۔

ج۔ کمیشن بینک ڈرافٹ یا پے آرڈر یا چیک یا کسی کوئی دستاویز فیس کے طور پر قبول نہیں کرے گا۔

د۔ پنجاب کا ڈومیسائل رکھنے والے بیرونِ ملک رہائش پذیر اُمیدوار آسامی کے لیے تجویز کی گئی درخواست/امتحانی فیس کے مساوی رقم اُس ملک کی کرنسی میں پاکستانی سفارت خانے میں جمع کروائیں گے۔

ڈ۔ جسمانی معذور اُمیدواروں کو درخواست/امتحان/ٹیسٹ فیس جمع کروانے کی ضرورت نہیں۔

آن لائن درخواست فارم جمع کروانے کا طریقِ کار

3۔ درخواست گذاروں کے لیے ضروری ہے کہ وہ "آن لائن درخواست فارم" اشتہار میں درج آخری تاریخ تک جمع کروائیں۔ اُمیدوار آن لائن فارم کو مذکورہ آسامی کے اشتہار میں درج رہنما اصولوں اور ہدایات کی روشنی میں احتیاط سے پُر کریں۔ کوائف کی درستی کے لیے ترمیم کی سہولت آن لائن درخواست فارم جمع کروانے کی آخری تاریخ تک موجود رہے گی۔ اُمیدواروں کو تاکید کی جاتی ہے کہ آن لائن درخواست جمع کرواتے وقت صرف اپنا ذاتی ای میل ایڈریس اور ذاتی موبائل نمبر ہی دیں۔

4۔ درخواستیں جمع کروانے کے لئے دی گئی آخری تاریخ تک تاریخ پیدائش میں درستگی کی اجازت ہے۔ اُمیدوار حسبِ ضرورت درخواستیں جمع کروانے کی آخری تاریخ تک اپنی تاریخ پیدائش کو آن لائن درخواست میں درست کر سکتے ہیں۔

کمیشن آن لائن درخواستوں کے علاوہ دیگر درخواستیں قبول نہیں کرے گا۔

5۔ درخواستوں کی وصولی کے لیے مقرر کردہ آخری تاریخ کے بعد اُمیدواروں کو آن لائن درخواست دینے کی اجازت نہ ہوگی۔

6۔ امیدواروں کے لیے ضروری ہے کہ وہ اس بات کو یقینی بنائیں کہ:

الف۔ ویب سے تیار کردہ درخواست فارم کا کوئی کالم خالی نہیں چھوڑا گیا۔

ب۔ بنیادی سکیل- 18 تک کی آسامیوں کے لیے کمیشن کو آن لائن درخواست کی طبع شدہ کاپی (Hard Copy) جمع کروانے کی ضرورت نہیں ہوگی۔

ج۔ بنیادی سکیل- 19 اور اوپر کی آسامیوں کے لیے جہاں انٹرویو سے قبل جانچ پڑتال ضروری ہے، آن لائن درخواست کی طبع شدہ کاپی کو تمام متعلقہ دستاویزات کی نقول کے ہمراہ متعلقہ اشتہار میں دی گئی ہدایات کے مطابق جمع کروایا جائے۔

د۔ کسی وجہ سے کوئی درخواست مسترد ہونے کی صورت میں عرضداشت، اگر کوئی ہو، "سیکرٹری، پنجاب پبلک سروس کمیشن"، ایل ڈی اے پلازہ، ایجرٹن روڈ نزد ایوانِ اقبال، لاہور کو مسترد نامہ/آسامی کے لیے دیے گئے اشتہار/اشتہارات میں دی گئی ہدایات کے مطابق بھیجی جائے گی۔

ڈ۔ کسی بھی مرحلے پر امیدوار کی جانب سے اس کے آن لائن درخواست فارم میں فراہم کی گئی معلومات کے غلط یا جھوٹا ثابت ہونے کی صورت میں اسے نااہل قرار دے دیا جائے گا اور قواعد کے تحت کارروائی کی جائے گی۔

اہلیت

میڈیکل فٹنس سرٹیفکیٹ

7۔ متعلقہ ضلعی ہیڈ کوارٹر ہسپتال یا سروسز ہسپتال، لاہور کے میڈیکل سپرنٹنڈنٹ کی جانب سے جاری کیا گیا میڈیکل سرٹیفکیٹ ضوابط/پالیسی فیصلوں کے تحت قابلِ قبول ہوگا۔ تاہم، آسامی کے لیے دیے گئے اشتہار میں درج آخری تاریخ سے قبل تین ماہ کے اندر جاری کیا گیا میڈیکل فٹنس سرٹیفکیٹ اس شرط کے تحت قابلِ قبول ہوگا کہ امیدوار اس آسامی کے لیے مجوزہ جسمانی معیار (Physical Standard) کے تمام تقاضوں پر پورا اترتا ہے جس کے لیے امیدوار نے درخواست دی ہے۔ مجاز اتھارٹی یعنی ضلعی ہیڈ کوارٹر ہسپتال یا سروسز ہسپتال کے میڈیکل سپرنٹنڈنٹ کا جاری کردہ میڈیکل فٹنس سرٹیفکیٹ آن لائن درخواستوں کی وصولی کی آخری تاریخ کے بعد قابلِ قبول نہیں ہوگا۔"

8۔ آسامی کے لیے امیدواروں کی اہلیت کا تعین درج ذیل کی بنیاد پر کیا جائے گا:-

الف۔ قواعد ملازمت/اشتہار میں تجویز کی گئی قابلیت/تجربہ۔

ب۔ حکومت یا کمیشن کی جانب سے وقتاً فوقتاً جاری کی گئی ہدایات۔

ج۔ امیدواروں کی عمر، تعلیمی قابلیت، تجربہ اور دیگر کوائف وغیرہ کا شمار اس آسامی کے لیے مقرر کی گئی آخری تاریخ تک کیا جائے گا۔

د۔ مزید واضح کیا جاتا ہے کہ پنجاب پبلک سروس کمیشن کو متعلقہ قواعد ملازمت/اشتہار میں تجویز کی گئی اہلیت کی شرائط میں نرمی کرنے کا کوئی اختیار نہیں ہے۔

قابلیت

9۔ اشتہار اور متعلقہ قواعد ملازمت میں درج قابلیت کمیشن کے لیے قابلِ قبول ہوگا اور اس کے سوا کسی بھی قابلیت کی بنیاد پر امیدوار کو آسامی کے لیے اہل قرار نہیں دیا جائے گا:-

الف۔ غیر ملکی ڈگریوں/ڈپلوموں کی قبولیت۔ کمیشن صرف انہی غیر ملکی یونیورسٹیوں کی ڈگریاں/سرٹیفکیٹ/ڈپلومے قبول کرے گا جو ہائر ایجوکیشن کمیشن (ایچ ای سی)، پاکستان میڈیکل اینڈ ڈینٹل کونسل (پی ایم ڈی سی)، پاکستان انجینئرنگ کونسل (پی ای سی)، پاکستان نرسنگ کونسل، انٹر بورڈ کمیٹی آف چیئرمین (آئی بی سی سی) یا کسی دیگر مجاز ایجنسی/اتھارٹی کی تسلیم شدہ ہیں۔

ب۔ **مساوی قابلیت کی قبولیت**۔ ہائر ایجوکیشن کمیشن (ایچ ای سی)، پاکستان میڈیکل اینڈ ڈینٹل کونسل (پی ایم ڈی سی) پاکستان انجینئرنگ کونسل (پی ای سی)، پاکستان نرسنگ کونسل، انٹر بورڈ کمیٹی آف چیئرمین (آئی بی سی سی) یا کسی دیگر مجاز کمیٹی/اتھارٹی اور مساوی قابلیت کے تعین کی کمیٹی (کیو ای ڈی سی) تسلیم شدہ اور انتظامی محکمے سے باضابطہ طور پر منظور شدہ تعلیمی قابلیت، کمیشن کی جانب سے حتمی طور پر قبول کی جائے گی۔

نوٹ: اگر امیدوار دعویٰ کرتا ہے کہ اس کی قابلیت مجوزہ قابلیت کے مساوی ہے، تو اس کے لیے ضروری ہوگا کہ وہ انٹرویو کے وقت یا جب کمیشن طلب کرے، مجاز اتھارٹی کی جاری کردہ مساوی قابلیت کی دستاویز جمع کروائے۔ اگر کوئی امیدوار انٹرویو کے وقت یا جب کمیشن طلب کرے، مجاز اتھارٹی کا جاری کردہ مساوی قابلیت کا سرٹیفکیٹ جمع کروانے میں ناکام رہتا ہے تو اس کی امیدواری حیثیت منسوخ کر دی جائے گی۔

عمر کا شمار

10۔ **تحریری امتحان کی بنیاد پر کی جانے والی بھرتی کی صورت میں امیدوار کی عمر اس سال کی یکم جنوری سے شمار کی جائے گی جس میں امتحان کا انعقاد کیا جاتا ہے اور دیگر تمام صورتوں میں عمر کا شمار درخواستوں کی وصولی کے لیے مقرر کردہ آخری تاریخ تک کیا جائے گا۔**

11۔ درخواستوں کی وصولی کی مشتہر کردہ آخری تاریخ یا اجتماعی/مقابلے کے امتحانات کے سال یکم جنوری کو امیدوار کی عمر میں اُس کی پیدائش کا دن شامل کرنے کے بعد اُس کے کم عمر یا زائد العمر ہونے کی صورت میں اُسے نااہل سمجھا جائے گا، خواہ ایسا ایک ہی دن کے فرق سے کیوں نہ ہو۔ ایسا اس بنا پر کیا گیا ہے کہ یکم جنوری کو پیدا ہونے والا بچہ اسی سال 31 دسمبر کو ایک سال کا ہو جائے گا۔ اگلے سال یکم جنوری کو اس کی عمر ایک سال اور ایک دن ہو جائے گی۔

(i) **امیدوار کی عمر شمار کرنے کی مثال**

آخری تاریخ پر عمر شمار کیے جانے کی صورت میں:

اگر امیدوار کی تاریخ پیدائش 15 اگست، 1970 ہے اور پی پی ایس سی آفس میں درخواستوں کی وصولی کی آخری تاریخ 7 فروری، 1998 ہے تو عمر مندرجہ ذیل طریقے سے شمار کی جائے گی:

		دن	مہینے	سال
• آخری تاریخ	-	07	02	1998
• امیدوار کی تاریخ پیدائش	-	15	08	1970
آخری تاریخ کو عمر		1+23	05	27

(27 سال، 05 مہینے اور 24 دن)

(ii) **امتحان کے مجوزہ انعقاد کے سال یکم جنوری کو عمر شمار کیے جانے کی صورت میں:**

اگر عمر کی بالائی حد 28 سال اور امیدوار کی تاریخ پیدائش یکم جنوری، 1988 ہے اور پی پی ایس سی آفس میں درخواستوں کی وصولی کی آخری تاریخ/امیدواروں کی عمر شمار کرنے کی تاریخ یکم جنوری، 2016 ہے تو عمر مندرجہ ذیل طریقے سے شمار کی جائے گی:

		دن	مہینے	سال
• آخری تاریخ/عمر شمار کرنے کی تاریخ	-	01	01	2016
• امیدوار کی تاریخ پیدائش	-	01	01	1988
آخری تاریخ کو عمر		1+00	00	28

(28 سال، 00 مہینے اور 01 دن)

12۔ امیدوار کی عمر اس کے سیکنڈری سکول سرٹیفکیٹ (میٹرک) پر درج تاریخ پیدائش کے مطابق شمار کی جائے گی۔ اگر امیدوار نے سیکنڈری سکول سرٹیفکیٹ کے مساوی سینئر کیمبرج/او۔لیول جیسا کوئی امتحان دیا ہو اور اس امتحان کے سرٹیفکیٹ پر امیدوار کی تاریخ پیدائش درج نہ ہو تو امیدوار پر لازم ہوگا کہ وہ مندرجہ ذیل دستاویزات پیش کرے؛

(الف) سکول چھوڑنے کا سرٹیفکیٹ جس پر اس کی تاریخ پیدائش درج ہے؛ یا

(ب) نیشنل ڈیٹا بیس اینڈ رجسٹریشن اتھارٹی (نادرا) کا جاری کردہ اصل اور موثر کمپیوٹرائزڈ قومی شناختی کارڈ (سی این آئی سی)؛ یا

(ج) متعلقہ مقامی کونسل اتھارٹی کی جانب سے باضابطہ طور پر جاری کردہ پیدائش کا سرٹیفکیٹ۔

13۔ امیدوار کو عمر کی بالائی حد میں چھوٹ/رعایت قانون، قاعدے اور حکومت کی پالیسی کے مطابق دی جائے گی۔

14۔ اسامیوں کی مشتہر کردہ تعداد میں اضافی اسامیاں شامل کیے جانے کی صورت میں، امیدوار کی عمر مندرجہ ذیل طریقے کے مطابق شمار کی جائے گی:-

الف۔ اصل اشتہار کے جواب میں درخواست دینے والے امیدواروں کی صورت میں ان کی عمر شمار کرنے کی تاریخ مذکورہ اشتہار میں دی گئی آخری تاریخ ہوگی۔

ب۔ ابتدائی/مقابلے کے امتحان میں شرکت کرنے والے امیدوار کے سوا، جنھوں نے بعد میں دیے گئے (اصل اشتہار میں دی گئی اسامیوں کی تعداد میں اضافہ کرنے والے) اشتہار کے جواب میں درخواست دی تھی، ان کے لیے یہ تاریخ (جس تاریخ تک ان کی عمر شمار کی جاتی ہے) بعد میں دیے گئے اشتہار میں درج آخری تاریخ ہوگی۔ تاہم، ابتدائی/مقابلے کے امتحان کے امیدواروں کی صورت میں، عمر اس سال کی یکم جنوری تک شمار کی جائے گی جس میں امتحان کا انعقاد تجویز کیا گیا ہے۔

ج۔ ایسے امیدوار جو اصل اشتہار کی آخری تاریخ پر عمر کم ہونے کی وجہ سے درخواست نہیں دے سکے، وہ بعد میں دیے گئے اشتہار میں درج آخری تاریخ تک مطلوبہ عمر کو پہنچنے پر درخواست دینے کے اہل ہو جائیں گے۔

عمر میں رعایت

15۔ پنجاب سول ملازمین کی بھرتی (عمر کی بالائی حد میں رعایت) قواعد، 1976 کے تحت عمر کی بالائی حد میں دی جانے والی رعایت درج ذیل ہے:-

الف۔ کسی بھی قاعدے کے تحت تقرری کی غرض سے عمر کی بالائی حد کے مقاصد کے لیے دفاعی افواج کے سابقہ افسران/عملے، دفاعی افواج میں سرانجام دی گئی خدمات کا مکمل عرصہ ان کی عمر سے منہا کر دیا جائے گا جو 10 سال تک کی زیادہ سے زیادہ حد سے مشروط ہوگا۔

ب۔ حکومتِ پنجاب کے تحت پہلے سے بطور سرکاری ملازم کام کرنے والے امیدوار کی صورت میں کسی بھی قاعدہ/ملازمت میں مجوزہ عمر کی بالائی حد کے مقاصد کی غرض سے اس آسامی کے لیے جس کا وہ امیدوار ہے اس کی مسلسل ملازمت کا عرصہ اس کی کل عمر سے منہا کر دیا جائے گا۔

تاہم ابتدائی مقابلے کے امتحان کی بنیادوں پر پنجاب پبلک سروس کمیشن کی سفارشات پر پُر کی جانے والی کسی آسامی پر بھرتی کے لیے عمر کی بالائی حد 35 سال سے زائد نہیں ہوگی۔

ج۔ پنجاب سول ملازمین کی بھرتی (عمر کی بالائی حد میں رعایت) قواعد، 1976 کے قاعدہ 2(iii) میں بیان کیے گئے معذور افراد کی صورت میں کسی آسامی پر تقرری کے لیے ملازمت/بھرتی کے قواعد میں تجویز کی گئی عمر کی بالائی حد میں 10 سال کا اضافہ کر دیا جائے گا۔

د۔ وفاقی حکومت یا وفاقی حکومت کے نیم سرکاری اور خود مختار اداروں یا صوبائی حکومت کے خود مختار اداروں اور مقامی اداروں کے ملازمین ایسی تنظیموں میں اپنی ملازمت کی مدت کے لیے عمر میں رعایت کے حق دار نہیں ہیں۔

اضافی نمبروں کا مطالبہ

16۔ اگر کوئی درخواست گزار دورانِ ملازمت فوت/معذور ہونے والے سول ملازم کا بیٹا/بیٹی ہونے کی بنا پر 10 اضافی نمبروں تک کا مطالبہ کرتا ہے تو اسے مندرجہ ذیل دستاویزات جمع کروانا ہوں گی:-

الف۔ متعلقہ کارپوریشن/میونسپلٹی سے والد یا والدہ، جو بھی صورت ہو، کی وفات کا سرٹیفکیٹ۔

ب۔ ایسا سرٹیفکیٹ جس میں معذور یا متوفی سول ملازم کا نام اور عہدہ درج ہو اور جسے اس محکمہ کی مجاز اتھارٹی نے جاری کیا ہو جہاں وہ ملازم تھا۔

ج۔ امیدوار کا بیانِ حلفی کہ وہ بے روزگار ہے اور اس نے نہ تو پہلے کبھی اضافی نمبروں کی رعایت لی ہے اور نہ ہی آئندہ یہ رعایت حاصل کرے گا/گی۔

د۔ امیدوار کے دیگر بھائیوں اور بہنوں کا بیانِ حلفی جس میں حلفاً یہ اقرار کیا گیا ہو کہ وہ امیدوار کے حق میں اپنے 10 اضافی نمبروں کے حق سے دست بردار ہوتے ہیں اور انھوں نے پہلے کبھی یہ رعایت حاصل نہیں کی اور نہ ہی آئندہ وہ اس کا مطالبہ کریں گے۔

ڈ۔ نادرا کا جاری کردہ نسب نامہ جس میں اہلِ خانہ کی تفصیل درج ہو۔

محکمانہ اجازت نامہ

17۔ امیدوار کے سرکاری ملازم ہونے کی صورت میں، متعلقہ محکمہ کی مجاز اتھارٹی کی جانب سے باضابطہ طور پر دستخط شدہ اور مہر شدہ محکمانہ اجازت نامہ (فارم پبلک سروس کمیشن کی ویب سائٹ www.ppsc.gop.pk پر دستیاب ہے) انٹرویو کے وقت جمع کروانا ضروری ہے۔

ڈومیسائل کی شرائط

18۔ امیدواروں کے لیے ڈومیسائل کے حوالے سے مندرجہ ذیل شرائط پوری کرنا ضروری ہے:-

- امیدوار کا ڈومیسائل سرٹیفکیٹ، درخواست وصول ہونے کی آخری تاریخ کو یا اس سے قبل صوبہ پنجاب کے متعلقہ ضلع سے جاری کردہ ہو۔ تاہم امیدوار کے آخری تاریخ سے قبل ڈومیسائل کے لیے درخواست جمع کروادی ہے اور اس حوالے سے دستاویزی ثبوت فراہم کر دیا ہے تو آخری تاریخ کے بعد جاری ہونے والا ڈومیسائل بھی قابلِ قبول ہوگا۔

الف۔ امیدوار کی جانب سے پیش کیا جانے والا اور جمع کروایا جانے والا سرٹیفکیٹ اسی ضلع سے ہونا چاہیے جو اس نے اپنی آن لائن درخواست کے متعلقہ کالم میں درج کیا ہے، بصورتِ دیگر درخواست مسترد کر دی جائے گی۔

ب۔ شادی شدہ خاتون امیدوار اپنے شوہر کے ڈومیسائل کے ضلع کا انتخاب کر سکتی ہے بشرطیکہ وہ اپنے سابقہ ڈومیسائل سرٹیفکیٹ سے دستبردار ہو چکی ہو اور ایسی صورت میں وہ اپنی شادی کے ثبوت کے ہمراہ اپنے شوہر کا ڈومیسائل سرٹیفکیٹ پیش کرے گی۔ مزید شرط یہ ہے کہ مذکورہ امیدوار کا سابقہ ڈومیسائل سرٹیفکیٹ اس امیدوار کی جانب سے مستقبل میں ڈومیسائل کے کسی دعویٰ کے لیے منسوخ متصور ہوگا۔

ج۔ آزاد جموں و کشمیر کے امیدوار جو آزاد جموں و کشمیر کے مستقل رہائشی ہیں لیکن پنجاب کا ڈومیسائل بھی رکھتے ہیں، انھیں پنجاب کے متعلقہ ضلع کے ڈومیسائل کی بنیاد پر زیرِ غور لایا جائے گا۔

تجربہ کا شمار

19۔ امیدواروں کا تجربہ شمار کرنے کے لیے مندرجہ ذیل معیار اپنایا جائے گا:-

الف۔ آسامی کے لیے اہلیت کی غرض سے درکار تجربہ کے تعین کے لیے امیدوار کو اپنے دعویٰ کی حمایت میں دستاویزی ثبوت پیش کرنا ہو گا۔

ب۔ سرکاری ملازمت کا تجربہ صرف اسی صورت میں قبول کیا جائے گا اگر سرٹیفکیٹ تقرر کرنے والی اس متعلقہ مجاز اتھارٹی/شخص کی جانب سے جاری کیا گیا ہو۔

ج۔ اگر کوئی امیدوار پرائیوٹ فرم/ادارے میں تجربہ رکھنے کا دعویدار ہو تو اسے انٹرویو کے وقت اس بات کا ثبوت پیش کرنا ہو گا کہ پرائیوٹ فرم/ادارہ سیکیورٹی اینڈ ایکسچینج کمیشن آف پاکستان (ایس ای سی پی)، رجسٹرار آف فرمز یا کسی دیگر ریگولیٹری اتھارٹی سے رجسٹرڈ ہے بصورت دیگر امیدوار کی درخواست مسترد کر دی جائیگی۔

د۔ سرکاری شعبے میں یا نجی شعبے کے منظور شدہ طبّی ادارہ میں ہاؤس جاب کا تجربہ عملی تجربہ شمار کیا جائے گا۔

ڈ۔ ایف۔ سی۔ پی۔ ایس/ایم۔ ایس/ایف۔ آر۔ سی۔ ایس/ایم۔ ڈی میں طبّی تربیت کی مدّت یا بیرونِ ملک تعلیم کے دوران امریکن بورڈ کے ڈپلومیٹ/فیلوشپ کا تجربہ متعلقہ شعبہ کے لیے ہی شمار کیا جائے گا۔

ذ۔ **متعلقہ شعبہ میں صرف وہی خصوصی/پیشہ ورانہ تجربہ شمار کیا جائے گا جو سرکاری شعبہ میں یا نجی شعبہ کے منظور شدہ اداروں میں کام کے دوران حاصل کیا گیا ہے۔**

ر۔ کنٹریکٹ، موجودہ چارج، قائم مقام چارج اور ایڈہاک تقرری کے حوالے سے تقرر کرنے والی اتھارٹی کی جانب سے قواعد کے تحت جاری کردہ تجربہ کا سرٹیفکیٹ قبول کیا جائے گا۔

ڑ۔ نجی اداروں کا تجربہ اسی صورت میں قبول کیا جائے گا اگر وہ ادارہ ایس ای سی پی، فرمز کے رجسٹرار یا کسی دیگر ریگولیٹری اتھارٹی سے رجسٹر شدہ ہے۔

ز۔ **اگر اہلیت کے لیے تجربہ لازمی شرط ہو تو اعزازی حیثیت میں حاصل کیا گیا تجربہ شمار نہیں کیا جائے گا سوائے اس کے کہ مجاز اتھارٹی کی جانب سے اس ضمن میں نوٹیفیکیشن جاری کیا گیا ہو۔**

ژ۔ عمومی مہارت (General Specialty) کا تجربہ کسی آسامی کے لیے مطلوبہ خصوصی مہارت (Specific Specialty) سے متعلقہ نہیں سمجھا جائے گا۔

ش. جہاں آسامی پر اہلیت کے قواعدِ ملازمت میں کم سے کم تعلیمی قابلیت کے ساتھ تجربہ کو بطور لازمی شرط تجویز کیا گیا ہے۔ ایسی صورتوں میں تجربہ کا محض وہ خاص دورانیہ شمار کیا جائے گا جو امیدوار کو مجوّزہ کم سے کم تعلیمی قابلیت کے حصول کے بعد حاصل ہے۔ تاہم اگر قواعدِ ملازمت میں یہ درج ہو کہ مجوّزہ تعلیمی قابلیت سے "پہلے" یا "بعد" کا تجربہ شمار کیا جائے گا، ایسی صورت/صورتوں میں تجربہ ملازمت کے متعلقہ قاعدہ/قواعد کے مطابق شمار کیا جائے گا۔

مثال

پنجاب کے محکمۂ تعلیم میں اسسٹنٹ پروفیسر کی آسامی کے لیے، ایم اے/ایم ایس سی کا امتحان پاس کرنے کے بعد کا کچھ تدریسی تجربہ اہلیت کی لازمی شرط ہے۔ ایسی صورت میں کمیشن امیدوار کا ایم اے/ایم ایس سی کی مجوّزہ تعلیمی قابلیت حاصل کرنے کے بعد کا مخصوص تجربہ ہی شمار کرے گا۔

نوٹ: معزز سپریم کورٹ آف پاکستان نے بھی سول پٹیشن نمبر 924-ایل/2014 بعنوان پنجاب پبلک سروس کمیشن بنام مسمات نسیرہ سعیدہ مورخہ 27 دسمبر، 2016 کو اپنے جاری کیے گئے فیصلے میں مندرجہ بالا پالیسی فیصلے کو برقرار رکھا ہے۔

تحقیقی تجربہ کا شمار

20۔ تحقیقی تجربہ سے مراد اس شعبہ مہارت میں تحقیق کرنے پر صرف کیا گیا عرصہ ہے:-

الف۔ ایم فل/پی ایچ ڈی پروگرام کے حصے کے طور پر صرف کیا گیا عرصہ تحقیقی تجربہ کے طور پر شمار کیا جائے گا جو ایم فل کے لیے زیادہ سے زیادہ دو سال اور پی ایچ ڈی کے لیے چار سال تک ہوگا۔

ب۔ امیدوار کا سرکاری یا منظور شدہ تحقیقی ادارے میں بطور ریسرچ اسسٹنٹ/ایسوسی ایٹ/آفیسر حاصل کردہ تحقیقی تجربہ، ایسے تجربہ کے طور پر قبول کیا جائے گا۔

تحقیقی مقالہ جات

21۔ درج ذیل کو یقینی بنایا جائے گا:-

الف۔ امیدوار کے لیے ضروری ہوگا کہ وہ، جہاں ایسا درکار ہو، شائع شدہ تحقیقی مقالہ جات کی دو نقول ہائر ایجوکیشن کمیشن کے تسلیم شدہ غیر ملکی جریدوں کی فہرست کے ہمراہ درخواست جمع کروانے کی آخری تاریخ کے بعد تین دن کے اندر جمع کروائے۔

ب۔ ہائر ایجوکیشن کمیشن (ایچ ای سی) کے تسلیم شدہ جریدہ یا ایچ ای سی کی تسلیم شدہ غیر ملکی یونیورسٹی کے جریدہ میں شائع ہونے والے تحقیقی مقالہ جات مزید جانچ کے بغیر قبول کر لیے جائیں گے۔

ج۔ کمیشن کسی امیدوار کے ایسے تحقیقی مقالہ جات قبول نہیں کرے گا جو مشتہر کی گئی آسامی کے لیے درخواستوں کی وصولی کی آخری تاریخ کے بعد کسی جریدے میں شائع ہوئے ہیں۔

د۔ ریویو آرٹیکل، کیس سٹڈیز، تراجم، پریس، کانفرنسوں میں پریزنٹیشن وغیرہ وغیرہ درانہ تحقیقی مقالہ جات کے طور پر قابل قبول نہ ہوں گے۔

ڈ۔ اگر قواعد/اشتہار میں شرط رکھی گئی ہے کہ تحقیقی مقالہ جات صرف اصل (Principal) مقالہ نگار کے تحریر کردہ ہوں تو تحقیقی مقالہ جات کے مقالہ نگاروں کی فہرست میں دیے گئے سب سے پہلے نام کو اصل مقالہ نگار سمجھا جائے گا۔

ماہرین کی رجسٹریشن

22۔ ماہرین کی رجسٹریشن کے لیے مندرجہ ذیل معیار اپنایا جائے گا:-

الف۔ میڈیکل آفیسر/وومن میڈیکل آفیسر/ڈینٹل سرجن وغیرہ کی آسامیوں کے لیے درخواست دینے والے امیدوار پی ایم اینڈ ڈی سی سے کروائی گئی مکمل میڈیکل رجسٹریشن جمع کروائیں گے جس میں ان کی میڈیکل کی تمام تر تعلیمی قابلیت درج ہوگی۔

ب۔ انجینئرز/دری انجینئرز، پاکستان انجینئرنگ کونسل ایکٹ، 1976 کے تحت پیشہ ور انجینئر کے طور پر رجسٹریشن کا سرٹیفکیٹ جمع کروائیں گے۔

ج۔ ماہرین تعمیرات اور ٹاؤن پلانرز، پاکستان کونسل آف آرکیٹیکٹس اینڈ ٹاؤن پلانرز ایکٹ، 1976 کے تحت رجسٹریشن کا سرٹیفکیٹ جمع کروائیں گے۔

د۔ قانون سے متعلقہ آسامیوں جیسا کہ اسسٹنٹ ڈسٹرکٹ پبلک پراسیکیوٹر اور ڈپٹی ڈسٹرکٹ اٹارنی اور ایسی ہی آسامیوں کے امیدوار متعلقہ بار کونسلوں سے رجسٹریشن کا موثر سرٹیفکیٹ جمع کروائیں گے۔

ڈ۔ اسی طرح نرسوں کے لیے پاکستان نرسنگ کونسل سے رجسٹر ہونا ضروری ہوگا۔

تحریری ٹیسٹ اور انٹرویو

23۔ امیدواروں کو تحریری امتحان/ٹیسٹ (جب بھی منعقد کیا جائے) میں عبوری طور پر (Provisionally) بیٹھنے کی اجازت دی جائے گی۔ تحریری امتحان/ٹیسٹ میں کامیاب ہونے والے امیدواروں کی درخواستوں اور دستاویزات کی تفصیلی جانچ انٹرویو کے وقت کی جائے گی۔ اگر کوئی امیدوار قانون یا قواعد کے تحت نااہل ہو جاتا ہے تو اس کے تحریری امتحان/ٹیسٹ میں شرکت کرنے اور اسے پاس کر لینے کے باوجود اس کی امیدواری حیثیت منسوخ کر دی جائے گی۔

24۔ امیدواروں کو انٹرویو کے لیے عبوری طور پر طلب کیا جائے گا۔ انٹرویو کے دن امیدواروں کی درخواستوں اور دستاویزات کی تفصیلی جانچ پڑتال، اگر کوئی امیدوار قواعد کے تحت کسی بھی حوالے سے نااہل ہو جاتا ہے تو اس کی امیدواری حیثیت مسترد کر دی جائے گی۔

25۔ پریشانی سے بچنے کے لیے امیدواروں کو ان کے اپنے مفاد میں ہدایت کی جاتی ہے کہ وہ درخواست دینے سے پہلے درخواستوں کی وصولی کی آخری تاریخ سے قبل اِس امر کو یقینی بنائیں کہ وہ مشتہر کیے گئے سیلیکشن کے معیار اور آسامی سے متعلقہ دیگر قواعد پر پورا اترتے ہیں۔

تحریری امتحانات/ٹیسٹ

26۔ کمیشن کا امتحانی نظام دو طرح کا ہے:-

الف۔ **تحریری امتحان۔** اگر حکومتِ پنجاب یا کمیشن لازمی تحریری امتحان تجویز کرے تو ایسا امتحان "تحریری امتحان" کہلائے گا۔

ب۔ **تحریری ٹیسٹ۔** "تحریری ٹیسٹ" سے مراد کمیشن کی جانب سے لیا جانے والا ایک پرچے پر مشتمل تحریری ٹیسٹ (انشائیہ یا معروضی یا دونوں) ہے۔

ج۔ **تحریری امتحان/ٹیسٹ کی اقسام اور مارکنگ**

(1) تحریری ٹیسٹ کا پرچہ تفصیلی (Descriptive)/انشائیہ طرز (Subjective Type) یا کثیر الانتخابی (Multiple Choice)، معروضی طرز (MCQs) یا دونوں پر مشتمل ہو سکتا ہے۔ نصاب اور تفصیلات پی پی ایس سی کی ویب سائٹ پر دستیاب ہیں۔

(2) کثیر الانتخابی/معروضی/ایم سی کیوز۔ پیپر میں منفی مارکنگ کی جائے گی اور ہر غلط جواب کے لیے 0.25 نمبر کاٹے جائیں گے۔

(3) ایسی آسامی کے لیے درخواست دینے والے امیدواروں سے تحریری ٹیسٹ لیا جا سکتا ہے جس کے لیے لازمی تحریری امتحان نہ رکھا گیا ہو۔ تحریری ٹیسٹ لینے یا نہ لینے کا اختیار مکمل طور پر کمیشن کو حاصل ہوگا۔

د۔ **تحریری امتحان/ٹیسٹ کے لیے اہلیت کی شرائط**

(1) امیدوار کے لیے ہر انشائیہ پرچے میں 40 فی صد نمبر لینا ضروری ہے (0.50 یا زائد نمبروں کا عدد اگلا مکمل عدد {round off} تصور کیا جائے گا)۔

(2) ایم سی کیو/معروضی پرچہ پاس کرنے کے لیے 40 فی صد نمبر درکار ہوں گے۔

(3) تحریری امتحان کی صورت میں امیدوار کو انٹرویو کا اہل ہونے کے لیے مجموعی طور پر 50 فی صد نمبر حاصل کرنا ہوں گے۔

ڈ۔ **تحریری امتحان/تحریری ٹیسٹ میں امیدوار کا داخلہ** امیدواروں کو ان کی اپنی ذمہ داری پر ان کی درخواستوں کی جانچ کیے بغیر عبوری طور پر تحریری امتحان/تحریری ٹیسٹ میں داخلے کی اجازت دی جائے گی جو انٹرویو کے وقت مطلوبہ دستاویزات کی جانچ کے بعد آسامی کے لیے اہل ہونے سے مشروط ہوگی۔

تحریری امتحان/ٹیسٹ کے لیے داخلہ نامہ {ایڈمیشن لیٹر} تحریری امتحانات/تحریری ٹیسٹوں کے داخلہ نامے اجتماعی طور پر کمیشن کی ویب سائٹ پر آپ لوڈ کر دیے جاتے ہیں۔ کسی بھی امیدوار کو انفرادی طور پر داخلہ نامہ جاری نہیں کیا جائے گا۔

ب۔ **تحریری امتحان/ٹیسٹ کے وقت اصل موثر کمپیوٹرائزڈ قومی شناختی کارڈ پیش کرنا**

امیدوار کی جانب سے تحریری امتحان/ٹیسٹ دینے کے لیے موثر قومی شناختی کارڈ (سی این آئی سی) پیش کرنا لازمی شرط ہے۔ تاہم کمپیوٹرائزڈ شناختی کارڈ کی میعاد ختم ہو جانے یا گم ہو جانے کی صورت میں **سنٹر انچارج کے اطمینان کے مطابق اصل موثر پاسپورٹ یا سروس کارڈ یا کوئی دیگر موثر/مستند اصل دستاویز پیش کرنے کی صورت میں** سنٹر کا انچارج افسر اس امیدوار کو عبوری طور پر تحریری امتحان/ٹیسٹ دینے کی اجازت دے گا۔ مزید شرط یہ ہے کہ سنٹر انچارج امیدواروں سے اس ضمن میں اقرار نامہ لے گا کہ وہ انٹرویو کے وقت اصل موثر سی این آئی سی پیش کریں گے اور ایسا نہ کرنے کی صورت میں ان کی امیدواری حیثیت منسوخ کر دی جائے گی۔ سنٹر انچارج اس اقرار نامہ کو امیدوار کی حاضری شیٹ سے لف کرے گا۔

ج۔ **انٹرویو کے وقت اصل موثر کمپیوٹرائزڈ شناختی کارڈ پیش کرنا**

اگر کوئی امیدوار انٹرویو کے وقت اپنا اصل کمپیوٹرائزڈ قومی شناختی کارڈ (سی این آئی سی) پیش نہیں کرتا اور متبادل موثر دستاویزات مثلاً پاسپورٹ/اصل ڈومیسائل/ڈگری/سرٹیفکیٹ جن پر امیدوار کی تصویر ہو کے ذریعے اپنی شناخت کراتا ہے تو اس کا عبوری انٹرویو کر لیا جائے گا۔ بشرطیکہ وہ ذاتی طور پر سات یوم کے اندر اپنا اصل کمپیوٹرائزڈ قومی شناختی کارڈ انٹرویو کرنے والی مجلس کے سربراہ رکن کے روبرو ذاتی طور پر پیش کرے۔ ناکامی کی صورت میں اس کی درخواست مسترد کر دی جائے گی۔ تاہم اگر امیدوار کے پاس زائد المیعاد کمپیوٹرائزڈ قومی شناختی کارڈ (سی این آئی سی) ہو تو اس کا انٹرویو عبوری طور پر لے لیا جائے گا لیکن اگر وہ مقررہ وقت کے اندر، جو سات ایام کار سے زائد نہ ہو گا، اپنا اصل موثر کمپیوٹرائزڈ شناختی کارڈ پیش نہیں کرتا/کرتی تو اُسے مسترد کر دیا جائے گا۔

د۔ **درخواست فیس جمع کروانا/آن لائن درخواست جمع کروانا**

اگر امیدوار کسی مخصوص آسامی کے لیے درخواست فیس جمع کروائے لیکن اپنی آن لائن درخواست غلطی سے کسی اور آسامی کے لیے جمع کروا دے جس کے لیے اس نے درخواست فیس جمع نہیں کروائی تو چیئرمین کی پیشگی منظوری سے اس کی درخواست پر اسی آسامی کے لیے غور کیا جا سکتا ہے جس کے لیے اس نے درخواست فیس جمع کروائی ہے۔ تاہم، ایک مخصوص آسامی کے لیے جمع کروائی گئی درخواست فیس کو کمیشن کی جانب سے مشتہر کی گئی کسی دیگر آسامی کے لیے تسلیم نہیں کیا جائے گا۔

ہ۔ **ایم سی کیو کی جوابی کاپی پر پیپر کوڈ درج کرنا**

امیدواروں کے لیے ضروری ہے کہ وہ جوابی کاپی میں مقررہ جگہ پر پیپر کوڈ احتیاط سے درج اور پُر کریں۔ ایسا نہ کرنے کی صورت میں ان کی جوابی کاپی منسوخ کر دی جائے گی۔

تحریری ٹیسٹ/امتحان کے سوال کی درستی پر اعتراض

اگر کسی سوال یا سوالات کی درستی کے حوالے سے کسی امیدوار کو کوئی اعتراض یا اعتراضات ہوں تو اُسے تحریری ٹیسٹ/امتحان کے دوران یا تحریری ٹیسٹ/امتحان کے بعد اسی روز تحریری طور پر پی پی ایس سی کے نوٹس میں لایا جا سکتا ہے۔ اس کے بعد کسی سوال یا سوالات کے سقم پر کوئی اعتراض زیرِ غور نہیں لایا جائے گا۔

لکھنے کا سامان جیسا کہ پوائنٹر/پنسل، پین/روشنائی اپنے ہمراہ لائیں۔ صرف سیاہ یا نیلی روشنائی کے استعمال کی اجازت ہے۔

رائٹر اور ریڈر کی فراہمی

27۔ کمیشن معذور امیدواروں کو تحریری امتحان/ٹیسٹ کے دوران معاون فراہم کرنے کے لیے موزوں نظام کار رکھتا ہے:-

الف۔ اگر معذور امیدوار اپنے تحریری امتحان/ٹیسٹ سے کم از کم 3 روز قبل کمیشن کو درخواست کرے تو اسے کمیشن کی جانب سے رائٹر/ریڈر فراہم کیا جائے گا۔

ب۔ رائٹر کی تعلیمی قابلیت اس اسامی کے لیے تجویز کردہ قابلیت سے ایک درجہ کم ہو گی جس کے لیے تحریری امتحان یا تحریری ٹیسٹ منعقد کیا جا رہا ہے۔

ج۔ کمیشن، تحریری امتحان/ٹیسٹ کے روز رائٹر/ریڈر کے لیے کی جانے والی درخواست قبول نہیں کرے گا۔

د۔ امیدواروں کو کمیشن کی پیشگی اجازت کے بغیر تحریری امتحان/ٹیسٹ کے لیے ان کا اپنا رائٹر/ریڈر لانے کی اجازت نہیں ہے۔

انٹرویو کے لیے امیدواروں کو شارٹ لسٹ کرنے کا طریق کار

28۔ انٹرویو کے لیے امیدواروں کی شارٹ لسٹنگ مندرجہ ذیل بنیادوں پر کی جائے گی:

الف۔ امیدواروں کا تعلیمی ریکارڈ

یا

ب۔ کمیشن کے منعقد کردہ تحریری ٹیسٹ میں حاصل کردہ نمبر

یا

ج۔ مندرجہ بالا (اے) اور (بی) دونوں کی بنیاد پر۔

تمام صورتوں (ماسوائے مقابلے کے امتحان) میں انٹرویو کے لیے بلائے جانے والے امیدواروں کی تعداد شمار کرنے کا فارمولا

29۔ انٹرویو کے لیے بلائے جانے والے امیدواروں کی تعداد باضابطہ مطالبہ {Requisition} میں درج اسامیوں کی تعداد پر منحصر ہو گی۔ ایک اسامی کے لیے پانچ (05) امیدواروں کو انٹرویو کے لیے بلایا جائے گا۔ انٹرویو کے لیے بلائے گئے تمام امیدواروں کے انٹرویو پاس نہ کرنے کی صورت میں چیئرمین کی پیشگی اجازت سے میرٹ لسٹ میں موجود اگلے امیدواروں کو مقررہ تناسب کے مطابق انٹرویو کے لیے بلایا جائے گا۔ تاہم چیئرمین معاملے کی نوعیت کے مطابق ہر ایک اسامی کے لیے بلائے جانے والے امیدواروں کی تعداد میں اضافہ کر سکتا ہے۔

30۔ مندرجہ بالا طریق کار خواتین، معذوروں اور اقلیتوں کے کوٹے پر انٹرویو کے لیے بلائے جانے والے امیدواروں پر بھی لاگو ہو گا۔

برابری کی صورت میں

31۔ "برابری کی صورت" میں شارٹ لسٹنگ مندرجہ ذیل طریق کار کے مطابق کی جاتی ہے:-

الف۔ **صرف تحریری ٹیسٹ کی صورت میں برابری کے کیس۔** تحریری ٹیسٹ میں مساوی نمبر حاصل کرنے والے امیدواروں کو امیدواروں/اسامیوں کے تناسب یعنی 1:5 کے تناسب سے بالاتر ہو کر انٹرویو کے لیے بلایا جا سکتا ہے۔

ب۔ **صرف تعلیمی قابلیت کی بنیاد پر برابری کے کیس۔** تعلیمی ریکارڈ کی بنیاد پر مساوی نمبر حاصل کرنے والے امیدواروں کو امیدواروں/اسامیوں کے تناسب یعنی 1:5 کے تناسب سے بالاتر ہو کر انٹرویو کے لیے بلایا جا سکتا ہے۔

آسامیوں کی تعداد میں اضافہ یا کمی

32۔ مجاز اتھارٹی کی جانب سے پی پی ایس سی ضوابط کی دفعات اور پالیسی فیصلوں کے تحت آسامیوں کی تعداد میں اضافہ یا کمی کرنے کی صورت میں، اخبارات میں نیا اشتہار یا تصحیح نامہ شائع کروایا جائے گا۔

نفسیاتی جانچ

33۔ تحریری امتحان پاس کر لینے والے امیدوار کو نفسیاتی جانچ کے لیے بلایا جائے گا۔

انٹرویو کا انعقاد

34۔ **انٹرویو کے لیے اہلیت کی شرائط** صرف انھی امیدواروں کو انٹرویو کے لیے بلایا جائے گا جو تحریری امتحان یا تحریری ٹیسٹ پاس کر چکے ہوں یا تعلیمی قابلیت کی بنیاد پر انٹرویو کے لیے شارٹ لسٹ کیے گئے ہوں یا کمیشن کے تحریری امتحان/تحریری ٹیسٹ/تعلیمی قابلیت کی بنیاد پر شارٹ لسٹنگ نہ کرنے کے فیصلے کی صورت میں تمام اہل امیدواروں کو انٹرویو کے لیے بلایا جائے گا۔ انٹرویو پاس کرنے کے لیے امیدوار کو انٹرویو میں 50 فی صد نمبر حاصل کرنا ہوں گے۔

انٹرویو لیٹر

35۔ درج ذیل امور سرانجام دیے جائیں گے:-

الف۔ مذکورہ آسامیوں کے لیے انٹرویو کا شیڈول کمیشن کی ویب سائٹ پر آپ لوڈ کیا جائے گا۔

ب۔ امیدوار اپنے انٹرویو لیٹر اور انٹرویو کی تاریخ، وقت اور جگہ سے متعلقہ معلومات پی پی ایس سی کی ویب سائٹ سے ڈاؤن لوڈ کر سکتے ہیں۔

ج۔ امیدواروں سے مراسلت صرف برقی ذرائع یعنی بذریعہ ایس ایم ایس، ای میل اور ویب سائٹ کی جائے گی۔ کسی بھی امیدوار کو انفرادی طور پر انٹرویو کی تاریخ سے مطلع نہیں کیا جائے گا۔

د۔ امیدواروں کو ہدایت کی جاتی ہے کہ وہ کسی مخصوص کیس نمبر کے حوالے سے کسی بھی طرح کی معلومات/اپ ڈیٹ حاصل کرنے کے لیے کمیشن کی ویب سائٹ www.ppsc.gop.pk کو باقاعدگی سے ملاحظہ کریں۔

ڈ۔ کمیشن کی جانب سے مطلوبہ دستاویزات کی نقول کا مطالبہ کیے جانے کی صورت میں امیدوار وہ نقول کوریئر یا رجسٹرڈ ڈاک کے ذریعے پی پی ایس سی، ایل ڈی اے پلازہ، ایجرٹن روڈ نزد ایوانِ اقبال، لاہور پر ارسال کر سکتے ہیں۔

ذ۔ کوئی مشکل پیش آنے کی صورت میں معاونت/وضاحت کے لیے امیدوار پی پی ایس سی آفس کی ہیلپ لائن پر رابطہ کر سکتے ہیں۔

اصل دستاویزات پیش کرنا

36۔ تعلیمی نمبر صرف انٹرویو کے وقت امیدوار کی جانب سے پیش کی گئی/جمع کروائی گئی اصل دستاویزات، سرٹیفکیٹس، ڈپلوموں یا ڈگریوں کی بنیاد پر ہی دیے جائیں گے۔ تاہم اگر اس وقت تک بورڈ/یونیورسٹی کی جانب سے ان مقاصد کے لیے اصل سرٹیفکیٹ/ڈپلومہ/ڈگری جاری نہ کی گئی ہو تو کمیشن، بورڈ آف انٹرمیڈیٹ اینڈ سیکنڈری ایجوکیشن یا یونیورسٹی کے کنٹرولر امتحانات کا جاری کردہ عبوری سرٹیفکیٹ قبول کرے گا۔

ڈگریوں/ڈپلوموں/سرٹیفکیٹوں پر طالب علم کو دیے گئے نمبر درج نہ ہونے اور امیدوار کے ایسی ڈگریوں/ڈپلوموں/سرٹیفکیٹوں کے نمبروں کی تفصیل کا سرٹیفکیٹ پیش کرنے میں ناکام رہنے کی صورت میں، کمیشن ایسا امتحان پاس کرنے کے لیے تجویز کردہ نمبروں کی کم سے کم کے مطابق نمبر دے گا۔ مثال کے طور پر اگر نمبروں کی تفصیل کا سرٹیفکیٹ پیش نہیں کیا جاتا/جمع نہیں کروایا جاتا تو مندرجہ ذیل معیار کے تحت دی گئی نمبروں کی کم سے کم قابلِ قبول شرح فی صد کے مطابق نمبر دیے جائیں گے:-

الف۔ ایم بی بی ایس/بی ڈی ایس پروفیشنل امتحانات کے لیے کم سے کم نمبر 50 فی صد ہیں۔ ایسوسی ایٹ ممبر آف انسٹی ٹیوٹ آف انجینئرز (اے ایم آئی ای) پر بھی اسی اصول کا اطلاق ہوتا ہے۔

ب۔ بی ایس سی (زراعت)/ایم ایس سی (زراعت) کے لیے کم سے کم نمبر 40 فی صد ہیں۔

ج۔ ایس ایس سی، ایچ ایس ایس سی، بی اے/بی ایس سی یا ایم اے/ایم ایس سی کے لیے کم سے کم نمبر 33 فی صد ہیں۔

د۔ شارٹ لسٹنگ اور انٹرویو/وائیوا کا تعلیمی میرٹ شمار کرنے کے لیے (اے) کی صورت میں 50 فی صد (بی) کی صورت میں 40 فی صد اور (سی) کی صورت میں 33 فی صد نمبر ہوں گے۔

مواقع کی تعداد

38۔ تحریری ٹیسٹ/تحریری امتحان/انٹرویو دینے والے اُمیدوار کو ہر مخصوص تحریری ٹیسٹ/تحریری امتحان/انٹرویو کے لیے اس تحریری ٹیسٹ/تحریری امتحان/انٹرویو کے لیے درجہ بند کی گئی آسامیوں کی قسم یا زمرہ سے قطع نظر تین مواقع فراہم کیے جائیں گے، ماسوائے محکمۂ تعلیم میں لیکچراروں کی آسامیاں، جہاں کسی اُمیدوار کے ایک سے زائد آسامی کے لیے درخواست دینے کی صورت میں اسے ہر اس مضمون کے لیے تین مواقع دیے جائیں گے جس کے لیے وہ اُمیدوار ہے۔

اُمیدواروں کو امتحان/ٹیسٹ کی تاریخ، وقت اور جگہ سے مطلع کرنے کا طریق کار اور اس کے بعد پی پی ایس سی کا اقدام

39۔ اُمیدوار کو تحریری امتحان/ٹیسٹ کی تاریخ، وقت اور مقام سے مطلع کرنے کا طریق کار مندرجہ ذیل ہے:۔

الف۔ اُمیدواروں سے مراسلت صرف برقی ذرائع یعنی بذریعہ ایس ایم ایس، ای میل اور ویب سائٹ کی جائے گی۔ کسی بھی اُمیدوار کو انفرادی طور پر امتحان/ٹیسٹ کی تاریخ سے مطلع نہیں کیا جائے گا۔

ب۔ تحریری امتحان/ٹیسٹ کا متوقع شیڈول تحریری امتحان/ٹیسٹ سے ترجیحاً 7 روز قبل کمیشن کی جانب سے ویب سائٹ پر جاری کر دیا جاتا ہے۔

ج۔ تحریری امتحان/ٹیسٹ کے اصل شیڈول کے حوالے سے اُمیدواروں کو اجتماعی طور پر تحریری امتحان/ٹیسٹ کی تاریخ، وقت اور جگہ سے مطلع کرنے کے لیے ای میل اور ایس ایم ایس تحریری امتحان/ٹیسٹ سے ترجیحاً 5 روز قبل بھیجا جاتا ہے جس میں پی پی ایس سی کی ویب سائٹ سے اپنی رول نمبر سلپ ڈاؤن لوڈ کرنے کی ہدایات درج ہوتی ہیں۔ اسے ویب سائٹ پر بھی جاری کیا جاتا ہے۔

د۔ تحریری امتحان/ٹیسٹ کی اصل تاریخ سے تین دن قبل اُمیدواروں کو تحریری امتحان/ٹیسٹ کی تاریخ، وقت اور جگہ کے بارے میں یاددہانی کے لیے ایس ایم ایس اور ای میل کی شکل میں ایک یاددہانی مراسلہ بھیجا جاتا ہے اور پی پی ایس سی کی ویب سائٹ پر فلیش پیغام جاری کیا جاتا ہے جس میں پی پی ایس سی کی ویب سائٹ سے اپنی رول نمبر سلپ ڈاؤن لوڈ کرنے (اگر پہلے ڈاؤن لوڈ نہ کی گئی ہو) کی ہدایات درج ہوتی ہیں۔

ہ۔ اگر اُمیدوار کو ویب سائٹ، ایس ایم ایس اور ای میل کے ذریعے اس کے تحریری امتحان/ٹیسٹ کے بارے میں کوئی اطلاع موصول نہ ہو تو وہ تحریری امتحان/ٹیسٹ کی مقررہ تاریخ سے کم از کم 3 روز قبل پی پی ایس سی کے یو اے این نمبر (042-111-988-722)، پی پی ایس سی آفس کے فون نمبر (99202761-62) سے اپنے سٹیٹس کی تصدیق کر سکتا/سکتی ہے۔

40- تحریری امتحان/ٹیسٹ میں پاس ہونے والے تمام امیدواروں کو مبارک باد کی ای میل بھیجی جاتی ہے جس میں انھیں عمل درآمد کے لیے چند ہدایات دی جاتی ہیں۔

الف۔ مبارک باد کی ای میل کے 2 روز بعد مندرجہ ذیل ایس ایم ایس اور ای میل تمام امیدواروں کو بھیجی جاتی ہے:-

آپ کو ہدایت کی جاتی ہے کہ اپنی ای میل میں درج دستاویزات کی نقول کا ایک سیٹ ــــــ تک جمع کروائیں، بصورت دیگر صورت میں آپ کو انٹرویو کے لیے نہیں بلایا جائے گا۔

ب۔ دستاویزات جمع کروانے کے لیے مقررہ تاریخ سے تین روز قبل، امیدواروں کو ایس ایم ایس/ای میل کے ذریعے مندرجہ ذیل یاددہانی مراسلہ بھیجا جاتا ہے:

آپ کو یاددہانی کروائی جاتی ہے کہ مطلوبہ دستاویزات کی نقول کا ایک سیٹ، جیسا کہ آپ کو قبل ازیں ویب سائٹ، ایس ایم ایس اور ای میل کے ذریعے مطلع کیا گیا ہے، ــــــ تک لازماً ارسال کریں، ایسا نہ کرنے کی صورت میں آپ کی درخواست مسترد متصور ہوگی۔

ج۔ تحریری امتحان/ٹیسٹ کی تاریخ سے ایک روز قبل امیدواروں کو مطلع کرنے کے لیے ویب سائٹ الرٹ جاری کیا جاتا ہے۔

امیدواروں کو انٹرویو کی تاریخ، وقت اور جگہ سے مطلع کرنے کا طریق کار

41- **تحریری ٹیسٹ کے بغیر انٹرویو کا انعقاد۔** درخواست موصول ہونے کی آخری تاریخ کے بعد دو دن کے اندر اور انٹرویو کے انعقاد کے فیصلے کے بعد، چاہے وہ فیصلہ درخواستوں کی جانچ پڑتال سے قبل یا جانچ پڑتال کے بعد یا صرف تعلیمی ریکارڈ کی بنیاد پر امیدواروں کی شارٹ لسٹنگ کے ذریعے کیا جائے، امیدواروں کو ویب سائٹ، ای میل اور ایس ایم ایس کے ذریعے درج ذیل ہدایات جاری کی جاتی ہیں:-

الف۔ تمام امیدواروں کو ای میل اور ایس ایم ایس بھیجا جاتا ہے جس میں امیدواروں کو اپنی دستاویزات کی نقول کا ایک سیٹ پیغام ملنے کے 7 روز کے اندر یا ــــــ تک لازماً جمع کروانے کی ہدایت کی جاتی ہے۔

ب۔ دستاویزات جمع کروانے کی مقررہ تاریخ سے تین روز قبل امیدواروں کو ویب سائٹ، ای میل اور ایس ایم ایس کے ذریعے ایک یاددہانی مراسلہ بھیجا جاتا ہے جس میں انھیں ہدایت کی جاتی ہے کہ وہ مطلوبہ دستاویزات کی نقول کا ایک سیٹ، جیسا کہ قبل ازیں ویب سائٹ، ایس ایم ایس اور ای میل کے ذریعے انھیں مطلع کیا گیا ہے، ــــــ تک لازماً ارسال کریں، ایسا نہ کرنے کی صورت میں ان کی درخواست مسترد متصور ہوگی اور بعدازاں کوئی عرضداشت زیر غور نہیں کی جائے گی۔

امتحان/ٹیسٹ کے بعد انٹرویو کا انعقاد

42- درج ذیل کو یقینی بنایا جائے گا:-

الف۔ انٹرویو سے کم از کم 7 روز قبل متوقع انٹرویو شیڈول پی پی ایس سی کی ویب سائٹ پر جاری کیا جاتا ہے۔

ب۔ انٹرویو کی مقررہ تاریخوں سے کم از کم 6 روز قبل امیدواروں کو پی پی ایس سی کی ویب سائٹ سے اپنا انٹرویو لیٹر ڈاؤن لوڈ کرنے کی ہدایات کے ساتھ ای میل اور ایس ایم ایس بھیجا جاتا ہے جس میں انھیں انٹرویو کی تاریخ، وقت اور جگہ سے مطلع کیا جاتا ہے۔

ج۔ اگر امیدوار کو کسی وجہ سے انٹرویو کی مقررہ تاریخ سے 3 روز قبل تک ویب سائٹ، ایس ایم ایس اور ای میل کے ذریعے اپنے انٹرویو کے بارے میں اطلاع موصول نہ ہو تو وہ پی پی ایس سی کی ویب سائٹ، یو اے این نمبر (042-111-988-722)، پی پی ایس سی آفس کے فون نمبر (99202761-62) سے اپنے سٹیٹس کی تصدیق کر سکتا/سکتی ہے۔

د۔ انٹرویو کی اصل تاریخ سے دو روز قبل امیدواروں کو انٹرویو کی تاریخ، وقت اور جگہ کے بارے میں یاددہانی کے لیے ایس ایم ایس اور ای میل کی شکل میں ایک یاددہانی مراسلہ بھیجا جاتا ہے اور پی پی ایس سی کی ویب سائٹ پر فلیش پیغام جاری کیا جاتا ہے جس میں **پی پی ایس سی کی ویب سائٹ سے اپنا انٹرویو لیٹر ڈاؤن لوڈ کرنے (اگر پہلے ڈاؤن لوڈ نہ کیا گیا ہو)** کی ہدایات درج ہوتی ہیں۔

ڈ۔ انٹرویو شیڈول سے ایک روز قبل امیدواروں کی اطلاع کے لیے ویب سائٹ الرٹ جاری کیا جاتا ہے۔

ر۔ اگر کسی امیدوار کو کسی وجہ سے اطلاع موصول نہ ہو یا ہنگامی حالات ہوں تو وہ اپنی شکایات کے ازالے کے لیے فون نمبر 62-99202761 پر پی پی ایس سی کے سیکرٹری سے رابطہ کر سکتا/سکتی ہے۔

میرٹ لسٹ

43- **میرٹ لسٹ کا مؤثر رہنا** متبادل امیدواروں کی سفارش کے لیے میرٹ لسٹ پہلی سفارش کے اجرا کی تاریخ سے صرف بارہ ماہ تک یا کمیشن کو اسی آسامی کے لیے اگلے باضابطہ مطالبہ (Requisition) کی تاریخ تک، جو بھی پہلے ہو، مؤثر رہتی ہے تاہم مؤثر رہنے کے عرصے کے دوران متبادل امیدواروں کے لیے درخواست موصول ہونے لیکن کسی وجہ سے میرٹ لسٹ جاری نہ ہو پانے کی صورت میں چیئرمین اپنی صوابدید پر ایسی درخواستیں نمٹانے کے لیے میرٹ لسٹ کے مؤثر رہنے کے دورانیے میں توسیع کر سکتا ہے۔

44- **سفارش کردہ امیدواروں کا متبادل** اگر متعلقہ محکمہ میرٹ لسٹ کے مؤثر رہنے کے عرصہ کے دوران درخواست کرے تو پی ایس سی موجودہ میرٹ لسٹ میں سے متبادل امیدوار فراہم کرے گا، اگر سفارش کردہ امیدوار:

الف۔ کسی بھی وجہ سے آسامی کو جوائن کرنے میں ناکام رہا ہے؛ یا

ب۔ جوائن کرنے کے بعد اپنا استعفیٰ پیش کرے؛ یا

ج۔ کسی وجہ سے محکمے کی جانب سے برطرف کر دیا گیا ہے؛ یا

د۔ طبی طور پر نااہل قرار دے دیا گیا ہے؛ یا

ڈ۔ تقرر کرنے والی اتھارٹی اسے پنجاب سول ملازمین (تقرری اور شرائط ملازمت) قواعد، 1974ء کے قاعدہ 21-اے (2) کے تحت تقرر نامہ {Appointment Letter} جاری کرنے سے انکار کرے۔

سفارش واپس لینا

45- کمیشن قانون کے تحت کسی بھی وقت منتخب کردہ امیدوار کی سفارش واپس لینے کا مجاز ہے اگر وہ بعد ازاں کسی وجہ سے اس آسامی کے لیے نااہل پایا گیا/گئی ہو۔

نقل کرنے/ہدایات کی خلاف ورزی کرنے یا جھوٹی معلومات فراہم کرنے پر امیدواروں کے خلاف کارروائی

46- امیدوار کو پی پی ایس سی کی جانب سے کسی آسامی کے لیے منعقد کیے گئے یا منعقد کیے جانے والے کسی تحریری امتحان/ٹیسٹ یا انٹرویو کے لیے نااہل قرار دیا جا سکتا ہے یا روک دیا جا سکتا ہے اگر وہ نقل کرنے/وقتاً فوقتاً جاری کردہ ہدایات کی خلاف ورزی کرنے یا کمیشن کو جھوٹی معلومات فراہم کرنے کا قصوروار پایا گیا/گئی ہو۔

متفرق

47- **درخواست نمبر گم ہو جانے کی صورت میں کیسے تلاش کیا جائے**

الف۔ اگر آپ سے آپ کا درخواست نمبر گم ہو جائے تو آپ اسے پی پی ایس سی کی ویب سائٹ کا مندرجہ ذیل لنک استعمال کر کے حاصل کر سکتے ہیں۔

http://www.ppsc.gop.pk/UsersReg/CheckApplicationNo.aspx

ب۔ مندرجہ بالا یو آر ایل کو لیں اور اپنا شناختی کارڈ نمبر درج کریں اور "Find Application Number" کے بٹن پر کلک کریں۔ آپ کا درخواست نمبر ان تمام آسامیوں سمیت جدول کی شکل میں سامنے آ جائے گا جن کے لیے آپ پی پی ایس سی میں درخواست دے چکے ہیں۔ آپ اپنا مطلوبہ نمبر یہاں سے حاصل کر سکتے ہیں۔

ج۔ یہ درخواست نمبر مندرجہ ذیل مقاصد کے لیے درکار ہے:-

(1) درخواست میں ترمیم کرنے کے لیے (آن لائن درخواست دینے کے بعد)

(2) سنگل پیپر ڈی ایم سی حاصل کرنے کے لیے۔ انٹرویو کے بعد

(3) ایم سی کیوز۔ پیپر کا ڈی ایم سی حاصل کرنے کے لیے۔ انٹرویو کے بعد

48۔ کسی بھی طرح کی معلومات/شکایات کے لیے براہ مہربانی یو اے این نمبر (042-111-988-772)، پی پی ایس سی آفس فون نمبر 99202761-62 پر رابطہ کریں۔ کسی وجہ سے کال نہ ملنے کی صورت میں اُمیدوار مندرجہ ذیل ای میل ایڈریس پر ای میل کے ذریعے کمیشن سے رابطہ کر سکتے ہیں:-

نمبر شمار	موضوع متعلقہ	دفتری ای میل ایڈریس
1	عام معلومات	ppsc@punjab.gov.pk
2	تکنیکی معلومات	dir.it@ppsc.gop.pk
3	بھرتی سے متعلق معلومات	dda@ppsc.gop.pk ddb@ppsc.gop.pk ddc@ppsc.gop.pk ddd@ppsc.gop.pk dde@ppsc.gop.pk ddf@ppsc.gop.pk ddg@ppsc.gop.pk ddh@ppsc.gop.pk ddj@ppsc.gop.pk ddk@ppsc.gop.pk ddm@ppsc.gop.pk
4	تحریری امتحان/ٹیسٹ سے متعلق معلومات	deputy.secy@ppsc.gop.pk
5	خاتون اُمیدواران	dir.monitoring@ppsc.gop.pk

موبائل نمبر کی تبدیلی

49۔ اگر کوئی اُمیدوار آن لائن درخواست میں پہلے سے دیا گیا موبائل نمبر تبدیل کرتا ہے تو وہ دستخط شدہ درخواست اصل اور موثر شناختی کارڈ کی ایک نقل، نئے موبائل نمبر، درخواست نمبر اور آسامی کے نام (جس کے لیے درخواست دی گئی ہے) کے ہمراہ بذریعہ ڈاک ارسال کرے گا/گی۔ درخواست سیکرٹری، پی پی ایس سی کے نام بھیجی جائے گی۔ پی پی ایس سی کو اطلاع دیے بغیر تبدیل کیے گئے موبائل نمبر کی صورت میں کمیشن اُمیدوار کو کسی بھی قسم کی اطلاع دینے کا ذمہ دار نہ ہوگا۔

تحریری امتحان/ٹیسٹ کے مراکز میں مندرجہ ذیل آلات لے جانے کی اجازت نہ ہوگی:-

50۔ پی پی ایس سی درج ذیل کی ہرگز اجازت نہیں دے گا:-

الف۔ اُمیدواروں کو کمرۂ امتحان میں اور انٹرویو کی جگہ پر موبائل فون یا ایسے آلات لے جانے کی اجازت نہ ہوگی۔

ب۔ اگر کوئی اُمیدوار امتحانی مرکز میں موبائل فون یا ایسے آلات استعمال کرتا ہوا پایا جائے تو سپروائزر کی جانب سے اس کے موبائل فون یا آلے کے ساتھ ساتھ اس کا پرچہ بھی ضبط کر لیا جائے گا اور ڈیوٹی پر موجود پی پی ایس سی کے رُکن کے حوالے کر دیا جائے گا۔

ج۔ اگر موبائل فون یا ایسے آلہ کے ڈیٹا سے نقل کیا جانا ثابت ہو جائے تو پی پی ایس سی کا رکن/مقام کا انچارج، مرکز کے سپروائزر کو نقل کرنے والے اُمیدوار کے خلاف ایف آئی آر درج کروانے کی ہدایت کرے گا اور پی پی ایس سی اُسے پی پی ایس سی ضوابط/پالیسی فیصلوں کے مطابق سزا دینے کے لیے کارروائی بھی کرے گا۔

انتباہ

براہِ مہربانی کسی بھی ایسے شخص سے رابطہ نہ رکھیں جو آپ کو پنجاب پبلک سروس کمیشن کے ذریعے ملازمت دلوانے کی پیشکش کرے کیونکہ پی پی ایس سی کا سسٹم اس قسم کی خلاف ورزی/رعایت کی اجازت نہیں دیتا۔ اپنی قابلیت پر اعتماد کریں اور اللہ (سبحانہ وتعالیٰ) پر بھروسہ رکھیں۔ اگر کوئی مشکوک شخص تحریری امتحان/ٹیسٹ یا انٹرویو میں کوئی ناجائز رعایت فراہم کرنے کے لیے رابطہ کرے تو براہِ مہربانی کمیشن کے مندرجہ ذیل معزز اراکین سے فوری طور پر رابطہ کریں:-

1۔ امتیاز احمد خان، رُکن پی پی ایس سی، (ای میل:member17@ppsc.gop.pk، فون:042-99202756)

2۔ امجد جاوید سلیمی، رُکن پی پی ایس سی، (ای میل:member6@ppsc.gop.pk، فون:042-99202751)

آپ کا نام صیغہ راز میں رکھا جائے گا اور آپ سے کوئی تعصب نہیں برتا جائے گا۔

نوٹ: اُردو میں دی ہوئی ہدایات میں کسی قسم کے ابہام یا کمی بیشی کی صورت میں انگریزی میں دی ہوئی ہدایات ملاحظہ کریں۔ انگریزی ہدایات حتمی تصور کی جائیں گی۔

دستاویز کا اختتام

سیکرٹری

پنجاب پبلک سروس کمیشن-لاہور

یو اے این : 042-111-988-722

How to Solve Multiple Choice Questions (MCQs) Correctly:

The following mentioned are the few multiple choice test tricks and strategies on how to pass a multiple choice test without studying.

1. Deterring conventional wisdom: Many individuals who take up objective type questions have the habit of guessing the middle option as the answer if they do not know. They also avoid answers which show none, all, always and never. This conventional wisdom will never help throughout the exam and so ignoring conventional wisdom is vital for answering a multiple choice answer.

2. Abolishing incorrect ones: For answering a multiple choice question, it is a fact that the multiple options are formatted in a tough manner. All the options seems to be right in some aspect and so the test taker can pick out the wrong answers first and then choose the right answer.

3. True or false test: Read the question carefully and if you're muddled by looking at the options, give each option a true or false test. Cross out the false answers and by this way the most appropriate answer can be found out.

4. Handling all of the above: In a multiple choice question when there is an option as "all of the above" be careful in answering such type of question. Check to see if more than two options are right, if so the choice can be opted.

5. Check the sentence: When your question ends with 'a', 'an' or 'the', then the answer should start appropriate to the article and hence correct answer can be chosen appropriately. Though this does not stand true for all questions, but can help for few which has articles in it . Few questions in English can be handled this way for picking the right option.

6. Longest options: In the midst of many questions when you find options with variable size of answers, pick the longest answer. It is a fact that the question designers cannot format very short answers.

7. Patterns and similarities: When there are options with many variables and so, look out for the options and its patterns and similarities. Pick choices which have the same patterns and leave out the outliners so that the nearest or right answer is picked.

8. Middle order: The middle order option is something which should be chosen, for example if the options are 100,150, 200, and 250 then choosing 150 or 200 can be the right choice. In such cases mostly, right answers are lesser than the maximum and higher than the lowest.

9. First impression: Always remember that the first impression is the best one. Once you have read the question, pick the right answer immediately. As you keep on reading the options there is a chance to choose the wrong option.

10. Chary (Careful, Cautious) reading and understanding: Test takers should make sure to read the question carefully though it is a timed test. Many individuals waste time without reading the question, hence it is important to read the question carefully and understand what is required.

11. Practicing: Practising well for exam is one way to score maximum. Past test papers, practice exams or study guides can give you an idea on how to answer MCQs.

12. Planning time: In order to use time appropriately, answer the questions for which you know the answers. For ones which you have a doubt, leave the doubtful question and skip over, at the end again read out the questions which you have not answered and complete the question paper. By this way your confidence is elevated and you also find more time for hard questions.

13. Focusing on keywords: The keywords in the question are to be identified and underlined which helps to narrow down the meaning. By this way the right option will match each and every part of the stem of the question. For the same paying attention to qualifiers, superlatives, negatives are important.

14. Pick the answer first: Once the question is read, formulate the answer in your mind rather than looking into the options. Once you have formulated the answers, look into the options and you can find the answer you formed.

15. Trust instincts: You may have opted for first option based on your first impression, you can also change the answer if you think another response is right. A concrete reasoning is mandatory to make any changes and not just feeling.

16. Number games never work all the time: Playing the odd doesn't work out all the time and so playing with such type of methods can be avoided. Guess work and game play with multiple type questions can be avoided as they do not work well all the time.

17. Learn from mistakes: It is always a good idea to learn from your mistakes. Once the paper is returned back to you, review the answers and find out the reason for the mistakes taken place. Reason out if it is the question pattern or study material which has made you to pick an incorrect answer. By this way mistakes in future can be avoided.

18. Answers hid in questions: A complete reading of the question paper is one way to find out few answers, this is because for some questions answers are found in the question itself. The questions may have a link and answers within it too.

19. Eliminate grammatically wrong answers: It is a good way to eliminate grammatically wrong answers in a multiple choice question. The answers would never make sense and hence grammatically wrong answers can be avoided.

20. Opposites can be the right answer: In a multiple choice paper, if two options are complete opposites then there is a chance that one of them might be the answer. It is actually a trick used by the professors to check the knowledge of the students in the subject.

21. Single word in many options: There are many questions where one word appears in more than one options. The answer must be one of those choices which have the same word. In this context eliminate the odd one and choose from the similar options.

22. Unrelated answers: Once the question is read the options would have answers related to the question, if there are answers which are unrelated to the question then they can be eliminated as wrong answer.

23. Proper preparation: It is true that multiple choice questions concentrate on minute details in the subject which cannot be retained in mind effectively. Preparing at an early stage is what a multiple choice exam requires. Frequent review and early preparations are ways to hack the multiple choice exercises instead of tricks and guess work.

24. Schduling: It is mandatory for intense preparation for any multiple choice paper, it would be advisable to pay attention to terms and concepts, observations, ideas and lot more. These tips are important as this would be the ones which most commonly appear in the exams. You can also make lists and tables of important ideas or events which makes learning easier.

25. Do not guess all the time: Almost all students guess most of the time for a multiple choice answers but guessing would not be apt for negative marking questions. Avoid guess work for negative marking questions as they may lower your final total.

Conclusion: These are a few hints which can be followed for answering multiple choice questionnaire, but these tips are not complete100% true to yield successful results. These are a few tricks to handle the questions. They work for some situations but not completely for all exams, all time and all scenarios. Prior preparations and training are mandatory aspects for any multiple choice exams. The skill to tackle a multiple choice test paper is mandatory and hence good preparation on the subject along with these techniques is required to win over such exams. Test takers and students can run through these tips with proper preparation and hack their multiple choice exams in the right manner rather than believing in guess work.

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MCQs Test Taking Tips & Strategies

Some useful tips and strategies to solve the MCQs are given below:

Read the entire question: Read a multi-choice question in its entirety before glancing over the answer options. Students often think they know what a question is asking before reading it and jump straight to the most logical answer. This is a big mistake and can cost you dearly on multiple-choice exams. Read each question thoroughly before reviewing answer options.

Answer it in your mind first: After reading a question, answer it in your mind before reviewing the answer options. This will help prevent you from talking yourself out of the correct answer.

Eliminate wrong answers: Eliminate answer options which you're 100 percent sure are incorrect before selecting the answer you believe is correct. Even when you believe you know the right answer, first eliminating those answers you know are incorrect will ensure your answer choice is the correct choice.

Use the process of elimination: Using the process of elimination, cross out all the answers you know are incorrect, then focus on the remaining answers. Not only does this strategy save time, it greatly increases your likelihood of selecting the correct answer.

Select the best answer: It's important to select the *best* answer to the question being asked, not just an answer the seems correct. Often many answers will seem correct, but there is typically a best answer to the question that your professors is looking for.

Read every answer option: Read every answer option prior to choosing a final answer. This may seem like a no brainer to some, but it is a common mistake students make. As we pointed out in the previous section, there is usually a *best* answer to every multiple-choice question. If you quickly assume you know the correct answer, without first reading every answer option, you may end up not selecting the *best* answer.

Answer the questions you know first: If you're having difficulty answering a question, move on and come back to tackle it once you've answered all the questions you know. Sometimes answer easier question first can offer you insight into answering more challenging questions.

Make an educated guess: If it will not count against your score, make an educated guess for any question you're unsure about. (Note: On some standardized tests incorrect answers are penalized. For example, a correct answer may be worth 2 points, an unanswered question 0 points, and an incorrect answer -1 points. On these tests, you can still make an educated guess, but only when you're able to eliminate at least one or two incorrect answers.)

Pay attention to these words: Pay particularly close attention to the words *not*, *sometimes*, *always*, and *never*. An answer that includes *always* must be irrefutable. If you can find a single counterexample, then the answer is not correct. The same holds true for the word *never*. If an answer option includes *never* a single counterexample will indicate the answer is not the correct.

It's usually best to stick with your first choice--but not always: It is best to stick with the answer you first chose after reading the question. It is usually counterproductive to constantly second guess yourself and change your answer. However, this doesn't mean your first answer choice is necessarily the correct answer choice. While multiple choice tests aren't usually intentionally designed to trick or confuse students, they are designed test students' knowledge and ability. To this end, the answer options provided will often include the *the most common wrong answer* among the choices or answers that seem logical but are ultimately incorrect, or the *best* answer.

"All of the above" and "None of the above": When you encounter "All of the above" and "None of the above" answer choices, do not select "All of the above" if you are pretty sure any one of the answers provided is incorrect. The same applies for "None of the above" if you are confident that at least one of the answer choices is true.

When there are seemingly two correct answers: When two answers are correct in a multiple choice question with an "All of the above" option, then it's probably the correct choice.

Place your bet on the positive option: In most cases, a positive option is probably true if there is also a negative one.

The more information... the better: More often than not, the correct answer usually contains more information than the other options. This is good to know if you must guess.

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Important Instructions for Solving MCQs Paper

1. Answer each question on the corresponding answer sheet provided. Please read carefully the important instructions printed red ink on the front page of the answer book.
2. Answers are to be given against the relevant question number. But if you miss the correct serial number of sequence of the questions, you are writing all your answers in the wrong columns which will give you no credit, try to be careful.
3. A short limited time is given for each question. You have to be quick in solving them. You should be accurate too, only quickness won't pay. If you are confused over certain question, leave it, don't waste your time over it. Proceed further without any hesitation.

Instructions for Computerized Answer Sheet

1. First of all, the roll number and your first name have to be filled out. You must write your name and roll number in block letters.
2. Every question contains four or five choices in the form of A, B, C, D, and E. Only one out of them is correct. Your answer sheet has five boxes A B C D and E for each question. Select the correct answer and blacken box of the corresponding letter completely and darkly. For example:

☛ **What is the total area of the world?**

(A) 2.55 billion years (B) **4.55 billion years**✓
(C) 6.55 billion years (D) 8.55 billion years

The correct answer is B, so shade the answer in this manner.

A	**B**	C	D

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Information about Punjab Higher Education Department

Overview - What HED Does:

Higher Education Department, (HED) is responsible for education, learning and related services for students, as well as Faculty/ teaching & non-teaching staff, serving in Public and Private Institutions in the province of Punjab. Its aim is to achieve a highly educated society; where educational opportunities are equally available for all young people in Pakistan, no matter what their social, ethnic, and cultural background or family circumstances are.

Our Vision:

To promote development of an enlightened and prospering Punjab by reinforcing knowledge economy along with a focus on equitable and quality learning. The realization of the higher education department's vision of "enlightened and prospering Punjab by reinforcing knowledge economy" rests on the shift from access to quality which is evident from the key initiatives it has taken in recent past.

Our Mission:

Improving quality of teaching, research and innovation, enhancing creativity and entrepreneurship and promoting equity, access, social cohesion and responsible citizenship.

Our Priorities:

- Establish Knowledge Park Lahore (KPL)
- Establish Bio Park/Science Research Park at Provincial Metropolis
- Organize International Education Expo (2014)
- Arrange Book Fair 2014
- Revise and Reform the Educational Curriculum as E-text
- Faculty Development Programme
- Celebration of Anti-Corruption Week
- Reduce Bureaucratic Monopoly and Improve Accountability
- Train and Develop the Professionals/ Faculty who work with students.
- Improve Quality Assurance Services (QAS) for college students
- Make HED as citizen centric Organization
- Assure prompt Capacity Building/ Provision of Missing Facilities in institutions.

Who We Are:

We are a Ministerial Department with a strong network of field offices to ensure compliance of Executive decisions. Currently HED operates through a network of one field headquarter, i.e., Directorate of Public Instructions Colleges Punjab, 09 Divisional Directorates, 37 District Directorates managing more than 750 colleges in Punjab.

Moreover, nine Boards of Intermediate and Secondary Education (BISE) for examination purposes, each at divisional headquarters are, working under the umbrella of HED. In addition to that more than 50 Public/ Private Sector Universities and 26 autonomous institutions are also operating under the supervision of HED.

History:

In 1947, the Directorate of Public Instructions, was the highest office of Education Department, under the supervision of Chief Secretary, Punjab . However, the Education Department under the administration of Secretary Education started functioning in West Pakistan province in 1955.

Higher Education Department is relatively a new department bifurcated from School Education Department of Government of the Punjab in 2008. In recent years, a renewed surge has been witnessed towards education reforms and development at national as well as provincial level.

Higher Education Department is relatively a new department separated from the Education Department of Government of the Punjab.

Objectives:

The basic aim of HED is not only to cater the educational needs of the target population i.e. the students, but also broaden their vision and mental horizon in order to equip them to deal better with the academic and economic challenges of the modern world.

The realization of the higher education department's vision of "enlightened and prospering Punjab by reinforcing knowledge economy" rests on the shift from access to quality, and for realization of this vision the department has outlined following objectives:

Improve Quality of Higher Education

- Increase number of skilled faculty
- Enhance quality of assessment system
- Increase market relevance of higher education programs

Expand Access

- Increase in number of students enrolled at college/university level

Enhance Equity

- Create opportunities for all income groups, social classes and genders
- Introduce a financial aid (loan) scheme in HEIs

- Increase number of need-based scholarships
- Create special opportunities for remote areas

Strengthen Governance and Management

- Raise students' commitment to higher education
- To Improve Infrastructure and Resource Provision

Functions:

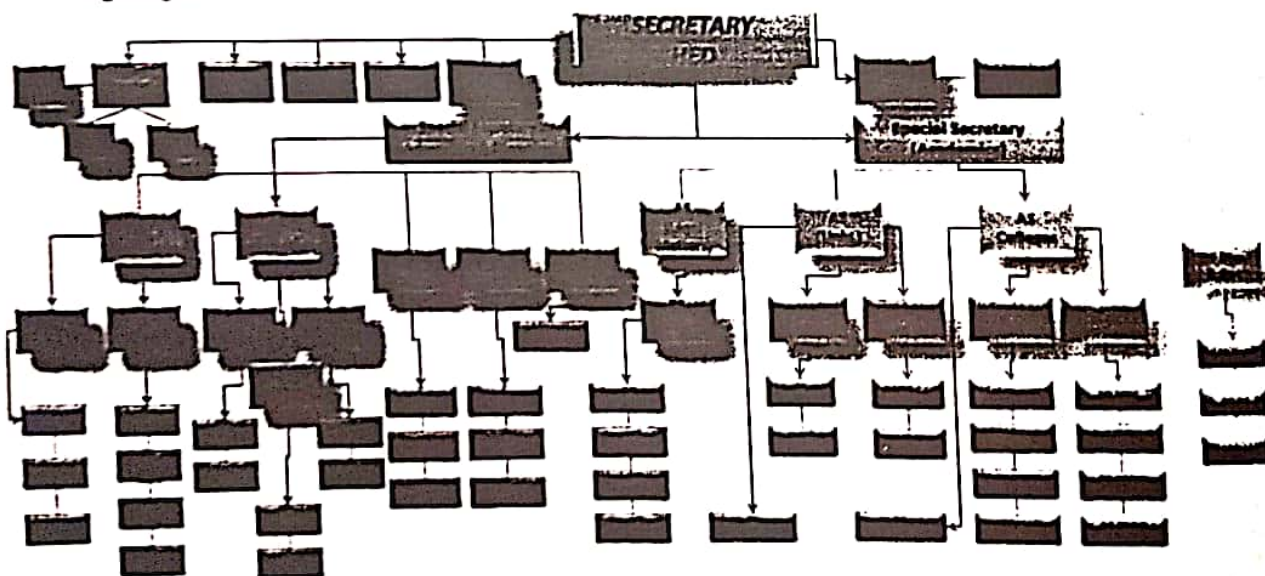
The department of Higher Education Punjab has administrative and financial control of the multi-tier Higher Education sector in the Punjab. It manages 517 colleges with general as well as specific programs in 37 districts of the province. It also supervises 09 Boards of Intermediate and Secondary Education, 17 Public Sector Universities and 26 Autonomous Educational Professional Institutions of Higher Education, Commerce Colleges.

The mandate of HED as identified in the Rules of Business 1974 is as follows:

- College Education General. (Post-Matric to Post Graduate Level)
- Universities and University Education excluding Agricultural University, Faisalabad
- Co-ordination of schemes for higher studies abroad
- Grant of scholarships
- Promotion of scientific research
- Organization of all Public Libraries including Municipal and other Libraries and to keep liaison with Universities, Colleges and Special Libraries for improving the standard of research and scholarship and further development of library science
- Ancient manuscripts and historical records
- Promotion of Sports
- Service matters except those entrusted to Services General Administration & Information Department
- Purchase of stores and capital goods for the Department
- Improvement of scientific, technological and professional education

Our Message

- I am extremely delighted to welcome you to the website of Higher Education Department. These pages are being introduced to assist you in acquiring the basic and the necessary information about the department. We assure you, that we will keep on improving and updating this information, as and when required, and will try to give response on your time to time queries.
- The Higher Education Department is performing and delivering, within the meager resources available, covering a diversified network of activities based on promoting the cause of Higher Education. It is linked with other provinces and the Federal Government to further enhance the said cause. This is a gigantic task, sometimes leading to the generation of the multifarious nature of problems which requires resetting the objectives according to the dynamic environment. We are hopeful that with the promotion of higher education and research, we will be in a position to resolve our National Issues vis a vis their linkage with the International horizon.

Organogram:

Higher Education Department, Punjab w.e.f. 26.11.2019

Attached Department:

Directorate of Public Instruction Colleges (Punjab) is a an attached department that performs a coordinating role between the secretariat and the district education office, and an augmenting role in policy formulation, administrative as well as financial matters.

DPI is assisted by an Additional DPI, and four directors [Planning, Academic, Administration (M) Administration (F)].

Key functions performed by the DPI Colleges can be listed as following:

- Implement government policies, directions and orders
- To assess the needs and requirements of the colleges and provision of funds, staff and buildings
- To assist the government in formulating policies in respect of academics, financial and administrative matters
- To act as coordinator between the government and other agencies including the Director /District Education Officers Colleges
- Maintenance of the career record of teaching staff of colleges(BPS 17, 18, 19 &20) and preparation of their promotion
- Administer inter, degree and post-graduate colleges
- Arrangements for teacher training
- Registration of private colleges
- Conduct of inquiries
- Settlement of audit paras
- Technical and administrative inspection of colleges
- Inter-district transfers of teaching and non-teaching staff up to BPS 19
- Sanction of Leave up to maximum of 365 days up to BPS 20, except ex-Pakistan leave

Divisional Directorates & Deputy Director Colleges

Higher Education sector has been administratively reconfigured by Divisional Directorates. The province is divided in 09 divisional directorates, with Director Colleges performing a supervisory role in the constituent districts. The key role of the DE Colleges is to maintain a liaison between field and administrative offices.

Deputy Director Colleges

The office was originally introduced under the LGO 2001 and key functions of the office included:

- Implement government policies
- Distribute budgetary grants to Colleges
- Prepare feasibility reports for up gradation of colleges and introduction of new subjects
- Prepare ADP schemes
- To maintain career records of the teaching and non-teaching staff up to BPS 17 within the district
- To award scholarships to eligible students
- To decide pension issues of employees up to BPS 18
- Appoint staff up to BPS 15 within the district
- Transfer teaching/non teaching staff up to BPS 19 within the district
- Monitor student affairs
- Promotion, move-over, selection grade issue of non-teaching staff up to BPS 15
- Sanction of leave not exceeding 90 days except study leave and ex-Pakistan leave up to BPS 19
- Issuance of NOC for passport Sanction of GP fund advance up to BPS 20
- Grant of relaxation (up to 5 years) in upper age limit for admission
- Grant of relaxation (up to 3 years) in upper age limit for recruitment (BPS 1 to BPS 15)

Rules & Regulations

Governing Laws

Educational Institutions

- Ali Institute of Education Lahore Act, 2010
- Forman Christian College Act, 2004
- Global Institute Lahore Act, 2011
- Hindu Gains of Learning Act, 1930
- Imperial College of Business Studies Lahore Ordinance, 2002
- Institute of Management Ssciences Lahore Ordinance, 2002
- Institute of Southern Punjab Multan Act, 2010
- Lahore School of Economics Act, 1997
- National College of Business Administration & Economics Lahore Ordinance, 2002
- Privately Managed Schools and Colleges (Taking over) Regulation, 1972
- Punjab Economic Research Institute Ordinance, 1980

- Punjab Government Educational and Training Institutions Ordinance, 1960
- Punjab Kinnaird College for Women Lahore Ordinance, 2002
- Punjab Private Colleges (Management and Control) Ordinance, 1970
- Punjaab Private Educational Institutions (Promotion and Regulation) Ordinance, 1984
- Superior College Lahore Act, 2004
- Sports (Development and Control) Ordinance, 1962

Universities

- Women University Multan Act, 2010
- Uversity of Sargodha Ordinance, 2002
- University of Wah Act, 2009
- University of the Punjab Act, 1973
- University of South Asia Lahore Act, 2005
- University of Management and Technology Lahore Act, 2004
- University of Lahore Ordinance, 2002
- University of Gujrat Act, 2004
- University of Faisalabad Ordinance, 2002
- University of Engineering and Technolgy Taxila Act, 1994
- University of Engineering and Technology Lahore Act, 1974
- University of Education Lahore Ordinance, 2002
- University of Central Punjab Lahore Ordinance, 2002
- Qarshi University Mundke Act, 2011
- Punjab Universities Removal of Undesirable Government Servants Ordinance, 1962
- Punjab Universities and Boards of Intermediate and Secondary Educaation Malpractices Act, 1950
- Minhaj University Lahore Act, 2005
- Lahore Leads University Act, 2011
- Lahore College for Women University ordinance, 2002
- Islamia University of Bahawalpur Act, 1975
- Information Techchnology University of the Punjab Act, 2012
- HITEC University of Taxila Act, 2009
- Hajvery University Lahore Ordinance, 2002
- Government Sadiq College Women University Bahawalpur Act, 2012
- Government College Women University Sialkot Act, 2012
- Government College Women University Faisalabad Act, 2012
- Govemmnet College University Lahore Ordinance, 2002
- Government College University Faisalabad Ordinance, 2002
- Gift Uuniversity Gujranwala Act, 2004
- Ghazi University Dera Ghazi Khan Act, 2012
- Fatima Jinnah Women University Rawalpindi Ordinance, 1999
- Beaconhouse National University Lahore Act, 2005
- Bahauddin Zakariya University Act, 1975

Education Boards

- The Punjab Information Technology Board Ordinance, 1999
- The Punjab Boards of Intermediate and Secondary Education Act, 1976
- The Punjab Textbook Board Ordinance, 1962
- Punjab Universities and Boards of Intermediate and Secondary Education Malpracticies Act, 1950
- The Punjab Boards of Technical Education Ordinance, 1962

Others

- PEEDA Act
- The Punjab Civil Servants Act 1974
- The Punjab Private Educational Institutional (Promotion and Regulation) Ordinance, 1984.
- The Punjab Examination Commission Act 2010
- The Punjab Departmental Inquiries (Powers) Act, 1958

Rules

- Business Rules
- Civil Service Pension Rules
- Paternity Leave Rules

Policies

- Transfer Policy 2013
- Regularization of all Contract Employees March 2013
- Leave Encashment Punjab Employees-Sep-2013

Legislative Background

- Legislative Background

FULLY SOLVED MODEL PAPER-2020

Paper Code
A

PUBLIC SERVICE COMMISSION

WRITTEN TEST FOR RECRUITMENT TO THE POST OF
LECTURER PHYSICS (BS-17)
IN THE PUNJAB HIGHER EDUCATION DEPARTMENT

ROLL NO.

TIME ALLOWED: TWO HOURS **MAXIMUM MARKS: 100**

INSTRUCTIONS

1. Write your allotted Roll No. in the top right corner of **QUESTION PAPER** and in the specified place of **ANSWER SHEET.**
2. Write **PAPER CODE** on your **ANSWER SHEET** carefully.
3. Read **QUESTION PAPER** carefully and mark your answer on the **ANSWER SHEET**.
4. Each question has four options. Fill only one box that you think in the correct answer. Each question caries 1 mark.
5. Instructions for filling box have been given on the Answer Sheet. Read them carefully before you attempting **Question Paper**.
6. Read the instructions for filling your **ROLL NO.** and marking your answer on the **ANSWER SHEET** before starting to answer.
7. Sign the **Answer Sheet** in the box provided at the bottom corner.
8. Return both **Question Paper** and **Answer Sheet,** to the Staff, at the end of the test.

Signature of the Candidate

☞ Every question contain four choices in the form of A, B, C and D. Only one out of them is correct. Your answer sheet has four boxes A B C and D for each question. Select the correct answer and blacken box of the corresponding letter completely and darkly. For example:

Q. What is the most important element of effective teaching?
(A) Sharing (B) Planning (C) Objectively (D) Division of Work ☐ ■ ☐ ☐
The correct answer is B, so shade the answer in this manner.

Subject Based Questions (80%)

1. Which of the following is not the mechanical wave?
(A) Sound wave (B) Light wave
(C) Waves produced in a spring (D) None of them✓

2. Longitudinal waves are also called:
(A) Compressional waves✓ (B) Transverse waves
(C) Radio waves (D) None of them

3. The distance covered by the wave during one period is called its:
(A) Wave number (B) Frequency
(C) Wavelength✓ (D) Time period

4. The distance covered by the wave in one second is:
(A) Wave number (B) Wavelength
(C) Frequency (D) Wave speed✓

5. A travelling wave has a shape of:
(A) Square wave (B) Sine wave✓
(C) Parabola (D) Hyperbola

6. In the same medium, velocity of the wave:
(A) Goes on increasing (B) Remains constant✓
(C) Goes on decreasing (D) None of these

7. The square root of 0.4 is ________.
(A) Greater than 0.4✓ (B) Smaller than 0.4
(C) Equal to 0.4 (D) None of them

8. A string is stretched between two points and is plucked at right angles to its length, the vibration produced is:
(A) Longitudinal wave (B) Transverse wave✓
(C) No vibration at all (D) None of these

9. Wavelength and time period T are related to the velocity v of the wave as:
(A) $\lambda = \frac{T}{v}$ (B) $\lambda = \frac{v}{T}$
(C) $\lambda = Tv$✓ (D) None of these

10. In compressional wave, the layer of medium having reduced pressure is called:
(A) Compression (B) Elasticity
(C) Node (D) Rarefaction✓

11. Transverse waves can be set up in:
(A) Solids (B) Liquids
(C) Gases (D) All of them✓

12. Absolute zero is considered as that temperature at which:
(A) All liquids become gases (B) All gases become liquids✓
(C) Water freezes (D) None of these

13. When two objects come to common temperature, the body is said to be in:
(A) Static equilibrium (B) Dynamic equilibrium
(C) Thermal equilibrium✓ (D) None of these

14. A gas which strictly obeys the gas laws under all conditions of temperatures and pressure is called:
(A) Ideal gas✓ (B) Inert gas
(C) Real gas (D) None of these

15. Real gases strictly obey gas laws at:
(A) High pressures and low temperatures (B) Low pressures and high temperatures✓
(C) High pressures & high temperatures (D) None of these

16. At constant temperature, if the volume of a given mass of a gas is doubled, then the density of gas becomes:
(A) Double (B) Remains constant
(C) Half✓ (D) None of these

17. The only significant motion possessed by the mono-atomic gas molecules is:
(A) Translatory✓ (B) Rotatory
(C) Vibratory (D) None of these

18. In the theory of dimensional analysis, heat may be properly represented by:
(A) ML^2T^{-2}✓ (B) MT^{-2}
(C) $ML^{-1}T^{-1}$ (D) None of these

19. The temperature scale approved in SI units is:
(A) Celsius scale (B) Kelvin scale✓
(C) Fahrenheit scale (D) None of these

20. Which of the following does not have the same units:
(A) Work (B) Heat
(C) Kinetic energy (D) Power✓

21. In an ideal gas, the molecules have:
(A) Kinetic energy only✓ (B) Potential only
(C) Both KE and PE (D) None of these

22. The motion of molecules in gases is:
(A) Orderly (B) Random✓
(C) Circular (D) All of these

23. At constant temperature, if the density of the gas is increased, its pressure will:
(A) Decrease (B) Increase✓
(C) Remains unchanged (D) None of these

24. Avogadro number is known as number of molecules in:
(A) One kg of a substance (B) Unit volume of a substance
(C) **One mole of a substance✓** (D) None of these

25. The relationship between Boltzmann constant k with R and N_A is given as:
(A) $k = RN_A$ (B) $k = \frac{R}{N_A}$✓
(C) $k = \frac{NR}{N_A}$ (D) None of these

26. In the region surrounding a current carrying wire:
(A) A magnetic field is set up
(B) The lines of force are elliptical
(C) Direction of lines of force depends upon direction of current
(D) **Both (A) and (C)✓**
(E) All of these

27. A current carrying conductor sets up its own:
(A) Electric field (B) Nuclear field
(C) Magnetic field (D) All of these
(E) **Both (A) and (C)✓**

28. It is customary to represent a current flowing towards the reader by a symbol:
(A) (×) (B) (+)
(C) **(.)✓** (D) (–)
(E) (÷)

29. The direction of force on a current carrying conductor placed in a magnetic field is that of:
(A) Length of conductor (B) Magnetic field
(C) **$\vec{L} \times \vec{B}$✓** (D) $\vec{L} . \vec{B}$
(E) None of these

30. The pointer of a magnetic compass:
(A) Is affected only by permanent magnets
(B) **Aligns itself parallel to the applied magnetic field✓**
(C) Vibrates in the magnetic field of the current
(D) Aligns itself perpendicular to the magnetic field
(E) Both (C) and (D)

31. Magnetic field is a:
(A) **Vector quantity✓** (B) Scalar quantity
(C) Scalar as well as vector quantity (D) Neither (A) nor (B)
(E) Any of (A) or (B)

32. The direction of magnetic lines of force around a current carrying wire is given by:
(A) Faraday's law (B) Head to tail rule
(C) **Right hand rule✓** (D) Both (A) and (B)
(E) None of these

33. If a copper rod carries a direct current, the magnetic field associated with the current will be:
(A) Only inside the rod (B) Only outside the rod
(C) **Both inside and outside the rod✓**
(D) Neither inside nor outside the rod
(E) None of these

34. The force on a current carrying conductor of length $\vec{L}$ placed in a magnetic field $\vec{B}$ depends upon:
(A) Angle between $\vec{L}$ and $\vec{B}$
(B) Current passing through the conductor
(C) **Length and magnetic field✓**
(D) Both (A) and (C) only
(E) All of these

35. Magnetic lines of force:
(A) Cannot intersect at all✓
(B) Intersect at infinity
(C) Intersect within magnet
(D) Intersect at neutral points
(E) None of these

36. The strength of magnetic field around a straight conductor:
(A) Is same every where around the conductor
(B) Obeys inverse square law
(C) Is directly proportional to the square of distance from the conductor
(D) All are true
(E) None of these✓

37. A current is passed through a straight wire. The magnetic field established around it has its lines of force:
(A) Circular and endless✓
(B) Oval in shape and endless
(C) Straight
(D) Parabolic
(E) All are true

38. If current carrying conductor is placed perpendicular to the magnetic field, it will experience a force:
(A) Zero
(B) ILB cos α
(C) ILB✓
(D) Both (A) and (B)
(E) Both (B) and (C)

39. What is the basic function of the below OP AMP circuit?

(a) Acts as a high impedance buffer with unity gain.✓
(b) Act as a low impedance buffer with unity gain.
(c) Acts as a high impedance buffer with gain equal to the open loop gain of the OP AMP.
(d) Acts as a low impedance buffer with gain equal to the open loop gain of the OP AMP.

40. 134.7 should be written in scientific notation as:
(A) 134.7
(B) 13.47×10^1
(C) 1.347×10^2✓
(D) 0.1347×10^3

41. Unit of solid angle is called:
(A) Radian
(B) Degree
(C) Steradian✓
(D) Angstrom

42. Unit for measuring intensity of light is:
(A) Candela✓
(B) Steradian
(C) Mole
(D) Decibel

43. J-second can be written in terms of base units as:
(A) $Kg\text{-}m^2\ sec^{-1}$✓
(B) $Kg\text{-}m^2\ sec^{-3}$
(C) $Kg\text{-}m\ sec^{-2}$
(D) $Kg^2\text{-}m^{-1}\ sec^2$

44. Light year is a unit of:
(A) Time
(B) Distance✓
(C) Velocity
(D) Intensity of light

45. $Kg\text{-}m^2\ sec^{-2}$ is SI unit of:
(A) Work✓
(B) Force
(C) Pressure
(D) Momentum

46. Typical examples of base quantities are:
(A) Length
(B) Mass
(C) Time
(D) Only A and C
(E) All of these✓

47. System International (SI) of units was established in:
(A) 1960✓
(B) 1970
(C) 1980
(D) 1990

48. Supplementary unit/s in SI units is/are:
(A) Radian
(B) Steradian
(C) Degree
(D) Only A and B✓
(E) All of these

49. Unit of pressure is:
(A) Watt
(B) Mole
(C) Candela
(D) Pascal✓

50. Pico, kilo and tera mean:
(A) $10^{-12}, 10^{-3}, 10^{-18}$
(B) $10^{18}, 10^3, 10^{-12}$
(C) $10^{-12}, 10^3, 10^{12}$✓
(D) $10^{18}, 10^{-12}, 10^3$

51. Unit of plane angle is:
(A) Degree
(B) Steradian
(C) Both A and B
(D) Radian✓

52. Unit/s of distance is/are:
(A) Metre
(B) Year
(C) Light year
(D) Both A and C✓
(E) Both B and C

53. Candela is a unit for measuring:
(A) Amount of substance
(B) Intensity of light✓
(C) Amount of current
(D) Distance

54. 1 m^3 is equal to:
(A) $10^6\ cm^3$
(B) $10^9\ mm^3$
(C) $10^{-6}\ cm^3$
(D) Both A and B✓

55. Steradian is the angle subtended at the centre of the ______.

(A) Circle (B) Sphere✓
(C) Any of these (D) square

56. Mole is a unit for measuring:
(A) Amount of substance✓ (B) Intensity of light
(C) Amount of current (D) mass

57. On conversion, Kg-m² sec² becomes:
(A) Newton (B) Joule✓
(C) Pascal (D) Watt

58. Time taken by light from Sun to reach Earth is:
(A) 500 seconds✓ (B) 600 seconds
(C) 400 seconds (D) 700 seconds

59. $[MLT^{-1}]$ and $[ML^2T^{-3}]$ are the dimensional representations respectively of:
(A) Work and momentum (B) Momentum and power✓
(C) Torque and power (D) Power and momentum

60. Dimensions are same for:
(A) Wavelength and amplitude (B) Inertia and moment of inertia
(C) Frequency and angular velocity (D) Both A and B are correct
(E) Both A and C are correct✓

61. Which quantity has different dimension?
(A) Tension✓ (B) Work
(C) Energy (D) Torque

62. The dimension of modulus of elasticity is:
(A) Different from that of coefficient of viscosity (B) The same as that of pressure
(C) The same as that of coefficient of viscosity (D) Both A and B are correct✓
(E) Both A and C are correct

63. Which quantity has different dimension?
(A) Tension (B) Force
(C) Weight (D) Modulus of elasticity✓

64. Planck constant has SI unit of J-second. Its dimension will be:
(A) $[ML^2T^{-2}]$ (B) $[ML^2T^{-1}]$✓
(C) $[M^2LT^{-1}]$ (D) $[ML^{-2}T^{-1}]$

65. Deuterium and triton are respectively the names of:
(A) Nucleus and atom of hydrogen
(B) Atom and nucleus of helium
(C) Atom and nucleus of hydrogen✓
(D) Nuclei of hydrogen atom
(E) None of these

66. The isotope/s of hydrogen is/are:
(A) Protium (B) Deuterium
(C) Tritium (D) Both (A) and (B)
(E) All of these✓

67. The nucleus/nuclei of hydrogen is/are:
(A) Proton (B) Deuteron
(C) Triton (D) All of these✓
(E) None of these

68. The ratio of mass of nucleus and the total mass of all the constituents making the nucleus is always:
(A) Equal to one (B) Less than one✓
(C) Greater than one (D) Any of these
(E) None of these

69. The total energy of the bound constituents in the nucleus is:
(A) Less than when they are free particles✓
(B) Greater than when they are free particles
(C) The same as when they are free particles
(D) Much greater than when they are free particles
(E) Infinite

70. For Protium, the mass defect is:
(A) Infinite (B) Zero✓
(C) Very large (D) A few grams
(E) None of these

71. The energy required to breakup a helium nucleus into its two protons and two neutrons is:
(A) 28.2 eV (B) 28.2 keV
(C) 28.2 MeV✓ (D) 28.2 meV
(E) 28.2 μeV

72. The binding energy for the nucleus of deuteron is:
(A) 2.23 MeV✓ (B) 28.2 MeV
(C) 2.23 keV (D) 28.2 keV
(E) None of these

73. Alpha-particle:
(A) Consists of two proton, and two neutrons
(B) Is actually helium nucleus
(C) Is positively charged
(D) Is nearly four times heavier than a proton
(E) All are true✓

74. Alpha particle:
(A) Is negatively charged
(B) Is another name of deuterium
(C) Is a helium nucleus✓
(D) Lighter than a proton
(E) Heavier than six neutrons

75. β-particle:
(A) Is an electron (B) Is negatively charged
(C) Is a neutral particle (D) Both (A) and (B)✓
(E) None is true

76. The radiation which is not affected by electric or magnetic field may be:
(A) α-radiation (B) β-radiation
(C) γ-radiation✓ (D) protons
(E) None of these

77. The mass and charge of an α-particle is:
(A) 4u and +2e✓ (B) 2u and +4e
(C) 2u and +2e (D) 4u and +4e
(E) None of these

78. Gamma rays are electromagnetic waves nearly similar to:
(A) Waves in water (B) X-rays✓
(C) Mechanical waves (D) Sound waves
(E) All of these

79. The pattern of NaCl particles have a shape which is:
(A) Cubic (B) Body centred cubic
(C) Simple cubic (D) Face centred
(E) Both (A) and (C)✓

80. In crystalline solids, atoms are held about their equilibrium positions depending upon the strength of:
(A) Adhesive forces (B) Nuclear forces
(C) Inter atomic cohesive force✓ (D) Electromagnetic force
(E) None of these

General Ability Test (20%)

General Knowledge

81. The longest river of Australia is:

(A) Mekong (B) Ob-Irtysh
(C) Oder (D) **Darling✓**
(E) None of these

82. Which country is called Land of Druk Yul?

(A) New Zealand (B) **Nepal✓**
(C) Norway (D) Somalia
(E) None of these

Pakistan Studies

83. **The Indian Muslims observed 'Day of Deliverance' after the RESIGNATION of Congress Ministries on:**
(A) 12 September, 1939
(B) 22 September, 1939
(C) 12 December, 1939
(D) **22 December, 1939✓**

84. **Chaudhri Rehmat Ali first used the word 'Pakistan' in his pamphlet 'Now or Never' in:**
(A) **1933✓** (B) 1935
(C) 1937 (D) 1938

Current Affairs

85. **Pakistani Cricketer Yasir Shah has become the fastest bowler to reach 200 wickets in Test Cricket breaking Australi's record set 82 years ago?**
(A) Glenn McGrath
(B) Mitchell Starc
(C) **Clarrie Grimmett✓**
(D) Nathan Lyon

86. **According World Bank Report 2018, Trade between Pakistan and South Asia valued at______ billion?**
(A) $ 2 Billion
(B) $ 39.7 Billion
(C) **$ 5.1 Billion✓**
(D) $ 4 Billion

Islamic Studies

87. 'Zakat' is worked out at the rate:
(A) 2 percent of 7 tola gold or 70 tola silver which remains with an individual for full one year
(B) **2 ½ percent of 7 ½ tola gold or 52 ½ tola silver which remains with an individual for full one year✓**
(C) 3 percent of 9 tola gold or 58 tola silver which remains with an individual for full one year
(D) None of these

88. **The Holy Prophet (PBUH) made hijrat from Makkah to Madinah in the year:**
(A) 610 A.D. (B) **622 A.D.✓**
(C) 626 A.D. (D) 632 A.D.

Geography

89. **Name the smallest country in Asia:**
(a) **Maldives ✓** (b) India
(c) China (d) Pakistan

90. **"Lake Titicaca" is located in:**
(a) Argentina (b) Bolivia
(c) **Peru ✓** (d) None of these

Basic Mathematics

91. **In one kilometer race, A beats B by 28 meters or 7 seconds. Find out the time taken by A to finish the race.**
(A) 4 mins 20 secs
(B) **4 mins 3 secs✓**
(C) 3 min 4 secs
(D) 5 mins

92. **Imran made a profit of 20 percent in the first year. Next year, he had a loss of 25 percent on the capital he had at the beginning of second year. What was his overall loss?**
(A) No loss (B) 12 percent
(C) 10 percent (D) **5 percent✓**

English

93. **Eminent means:**
(A) Hardworking (B) Clever
(C) **Famous✓** (D) Ambitious

94. **Which word is wrongly spelt in the following set of words?**
(A) Gratitude (B) Confusion
(C) **Priveous✓** (D) Companion

Everyday Science

95. **Pakistan plans to send first Astronaut to space in?**
(A) 2020 (B) **2022✓**
(C) 2026 (D) 2024

96. Cytology is the:
(A) **Study of living cells✓**
(B) Study of harmones
(C) Study of seeds
(D) Study of surface tension

Basic Computer Studies

97. **What is the largest font size available in the font size tool on formatting toolbar?**
(A) 78 (B) **72✓**
(C) 75 (D) 68

98. Selecting text means selecting ________.
(A) A word
(B) An entire sentence
(C) **Whole document✓**
(D) None of these

Urdu

.99 مشہور نظم ''طلوع اسلام'' کے شاعر کون ہیں؟
(A) علامہ اقبال✓ (B) حفیظ جالندھری
(C) مولانا ظفر علی خان (D) الطاف حسین حالی

.100 مندرجہ ذیل الفاظ قواعد کی رو سے کیا ہیں؟
پنکھڑی، پہاڑی، ٹوکری
(A) اسم مفعول (B) اسم ظرف
(C) اسم تصغیر✓ (D) اسم مکبر

SAMPLE MCQ ANSWER SHEET

PUBLIC SERVICE COMMISSION

Name:______________________

Father's Name:______________________

Post Applied For:______________________

C.N.I.C. No. [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Exam. Centre:______________________

______________ Domicile:______________

INSTRUCTIONS

- Use Black Marker.
- Fill the circle completely
- Make no stray marks.
- Filling or partially filling more than one circle shall be considered a wrong answer.

Example

Right	Wrong
1. Ⓐ Ⓑ ● Ⓓ	1. ● Ⓑ ● Ⓓ
	2. Ⓐ ◐ Ⓒ Ⓓ
	3. Ⓐ Ⓑ ◒ Ⓓ
	4. Ⓐ Ⓑ Ⓒ ◉

For Office Use Only

ROLL NUMBER

①	①	①	①	①
②	②	②	②	②
③	③	③	③	③
④	④	④	④	④
⑤	⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨
⓪	⓪	⓪	⓪	⓪

Mention Paper Code here and fill the relevant circle: [ ]

ROLL NUMBER

Paper Code: Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ

1. Ⓐ Ⓑ Ⓒ Ⓓ	26. Ⓐ Ⓑ Ⓒ Ⓓ	51. Ⓐ Ⓑ Ⓒ Ⓓ	76. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ	27. Ⓐ Ⓑ Ⓒ Ⓓ	52. Ⓐ Ⓑ Ⓒ Ⓓ	77. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ	28. Ⓐ Ⓑ Ⓒ Ⓓ	53. Ⓐ Ⓑ Ⓒ Ⓓ	78. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ	29. Ⓐ Ⓑ Ⓒ Ⓓ	54. Ⓐ Ⓑ Ⓒ Ⓓ	79. Ⓐ Ⓑ Ⓒ Ⓓ
5. Ⓐ Ⓑ Ⓒ Ⓓ	30. Ⓐ Ⓑ Ⓒ Ⓓ	55. Ⓐ Ⓑ Ⓒ Ⓓ	80. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓐ Ⓑ Ⓒ Ⓓ	31. Ⓐ Ⓑ Ⓒ Ⓓ	56. Ⓐ Ⓑ Ⓒ Ⓓ	81. Ⓐ Ⓑ Ⓒ Ⓓ
7. Ⓐ Ⓑ Ⓒ Ⓓ	32. Ⓐ Ⓑ Ⓒ Ⓓ	57. Ⓐ Ⓑ Ⓒ Ⓓ	82. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓐ Ⓑ Ⓒ Ⓓ	33. Ⓐ Ⓑ Ⓒ Ⓓ	58. Ⓐ Ⓑ Ⓒ Ⓓ	83. Ⓐ Ⓑ Ⓒ Ⓓ
9. Ⓐ Ⓑ Ⓒ Ⓓ	34. Ⓐ Ⓑ Ⓒ Ⓓ	59. Ⓐ Ⓑ Ⓒ Ⓓ	84. Ⓐ Ⓑ Ⓒ Ⓓ
10. Ⓐ Ⓑ Ⓒ Ⓓ	35. Ⓐ Ⓑ Ⓒ Ⓓ	60. Ⓐ Ⓑ Ⓒ Ⓓ	85. Ⓐ Ⓑ Ⓒ Ⓓ
11. Ⓐ Ⓑ Ⓒ Ⓓ	36. Ⓐ Ⓑ Ⓒ Ⓓ	61. Ⓐ Ⓑ Ⓒ Ⓓ	86. Ⓐ Ⓑ Ⓒ Ⓓ
12. Ⓐ Ⓑ Ⓒ Ⓓ	37. Ⓐ Ⓑ Ⓒ Ⓓ	62. Ⓐ Ⓑ Ⓒ Ⓓ	87. Ⓐ Ⓑ Ⓒ Ⓓ
13. Ⓐ Ⓑ Ⓒ Ⓓ	38. Ⓐ Ⓑ Ⓒ Ⓓ	63. Ⓐ Ⓑ Ⓒ Ⓓ	88. Ⓐ Ⓑ Ⓒ Ⓓ
14. Ⓐ Ⓑ Ⓒ Ⓓ	39. Ⓐ Ⓑ Ⓒ Ⓓ	64. Ⓐ Ⓑ Ⓒ Ⓓ	89. Ⓐ Ⓑ Ⓒ Ⓓ
15. Ⓐ Ⓑ Ⓒ Ⓓ	40. Ⓐ Ⓑ Ⓒ Ⓓ	65. Ⓐ Ⓑ Ⓒ Ⓓ	90. Ⓐ Ⓑ Ⓒ Ⓓ
16. Ⓐ Ⓑ Ⓒ Ⓓ	41. Ⓐ Ⓑ Ⓒ Ⓓ	66. Ⓐ Ⓑ Ⓒ Ⓓ	91. Ⓐ Ⓑ Ⓒ Ⓓ
17. Ⓐ Ⓑ Ⓒ Ⓓ	42. Ⓐ Ⓑ Ⓒ Ⓓ	67. Ⓐ Ⓑ Ⓒ Ⓓ	92. Ⓐ Ⓑ Ⓒ Ⓓ
18. Ⓐ Ⓑ Ⓒ Ⓓ	43. Ⓐ Ⓑ Ⓒ Ⓓ	68. Ⓐ Ⓑ Ⓒ Ⓓ	93. Ⓐ Ⓑ Ⓒ Ⓓ
19. Ⓐ Ⓑ Ⓒ Ⓓ	44. Ⓐ Ⓑ Ⓒ Ⓓ	69. Ⓐ Ⓑ Ⓒ Ⓓ	94. Ⓐ Ⓑ Ⓒ Ⓓ
20. Ⓐ Ⓑ Ⓒ Ⓓ	45. Ⓐ Ⓑ Ⓒ Ⓓ	70. Ⓐ Ⓑ Ⓒ Ⓓ	95. Ⓐ Ⓑ Ⓒ Ⓓ
21. Ⓐ Ⓑ Ⓒ Ⓓ	46. Ⓐ Ⓑ Ⓒ Ⓓ	71. Ⓐ Ⓑ Ⓒ Ⓓ	96. Ⓐ Ⓑ Ⓒ Ⓓ
22. Ⓐ Ⓑ Ⓒ Ⓓ	47. Ⓐ Ⓑ Ⓒ Ⓓ	72. Ⓐ Ⓑ Ⓒ Ⓓ	97. Ⓐ Ⓑ Ⓒ Ⓓ
23. Ⓐ Ⓑ Ⓒ Ⓓ	48. Ⓐ Ⓑ Ⓒ Ⓓ	73. Ⓐ Ⓑ Ⓒ Ⓓ	98. Ⓐ Ⓑ Ⓒ Ⓓ
24. Ⓐ Ⓑ Ⓒ Ⓓ	49. Ⓐ Ⓑ Ⓒ Ⓓ	74. Ⓐ Ⓑ Ⓒ Ⓓ	99. Ⓐ Ⓑ Ⓒ Ⓓ
25. Ⓐ Ⓑ Ⓒ Ⓓ	50. Ⓐ Ⓑ Ⓒ Ⓓ	75. Ⓐ Ⓑ Ⓒ Ⓓ	100. Ⓐ Ⓑ Ⓒ Ⓓ

Signature of Candidate:______________

Signature of Supervisor:______________

Physics Post Based Test 80%

Waves & Oscillation

TYPES OF WAVES AND WAVE MOTION

1. The waves which propagate through the oscillations of material particles are known as:
   (A) Mechanical waves✓ (B) Electromagnetic waves
   (C) Any of them (D) None of them
2. The waves which propagate out in space due to oscillations of electric and magnetic fields are called:
   (A) Mechanical waves (B) Electromagnetic waves✓
   (C) Matter waves (D) All of them
3. Which of the following is/are example/s of mechanical waves i.e. waves generated in ______.
   (A) Rope (B) Coil of spring
   (C) Water (D) All of them✓
4. When a wave travels from one place to another, it transfers:
   (A) Matter (B) Energy
   (C) Momentum (D) Both B and C✓
5. Which of the following is not the mechanical wave?
   (A) Sound wave (B) Light wave
   (C) Waves produced in a spring (D) None of them✓
6. Longitudinal waves are also called:
   (A) Compressional waves✓ (B) Transverse waves
   (C) Radio waves (D) None of them
7. The distance covered by the wave during one period is called its:
   (A) Wave number (B) Frequency
   (C) Wavelength✓ (D) Time period
8. The distance covered by the wave in one second is:
   (A) Wave number (B) Wavelength
   (C) Frequency (D) Wave speed✓
9. A travelling wave has a shape of:
   (A) Square wave (B) Sine wave✓
   (C) Parabola (D) Hyperbola
10. In the same medium, velocity of the wave:
    (A) Goes on increasing (B) Remains constant✓
    (C) Goes on decreasing (D) None of these
11. The square root of 0.4 is ______.
    (A) Greater than 0.4✓ (B) Smaller than 0.4
    (C) Equal to 0.4 (D) None of them
12. A string is stretched between two points and is plucked at right angles to its length, the vibration produced is:
    (A) Longitudinal wave (B) Transverse wave✓

(C) No vibration at all (D) None of these

13. Wavelength and time period T are related to the velocity v of the wave as:
   (A) $\lambda = \frac{T}{v}$ (B) $\lambda = \frac{v}{T}$
   (C) $\lambda = Tv$✓ (D) None of these

14. In compressional wave, the layer of medium having reduced pressure is called:
   (A) Compression (B) Elasticity
   (C) Node (D) Rarefaction✓

15. Transverse waves can be set up in:
   (A) Solids (B) Liquids
   (C) Gases (D) All of them✓

16. Fluids can transmit:
   (A) Transverse wave (B) Compressional wave✓
   (C) Both of them (D) None of them

17. In solids, only following type/s of wave can travel:
   (A) Transverse (B) Longitudinal
   (C) Both A and B✓ (D) None of above

18. Which of the following medium/media can transmit both transverse and longitudinal waves:
   (A) Solids✓ (B) Liquids
   (C) Gases (D) All of them

19. Which one of the following elasticities is possessed by fluids:
   (A) Young's elastic modulus (length) (B) Bulk elastic modulus (volume)✓
   (C) Modulus of rigidity (shape) (D) None of these

20. The speed of the waves in the string in terms of the tension F and mass per unit length (m) of the string is given by:
   (A) $v = \sqrt{\frac{F \times \ell}{m}}$ (B) $v = \sqrt{\frac{F}{m}}$✓
   (C) $v = \sqrt{\frac{m}{f}}$ (D) $v = \sqrt{\frac{F}{m\ell}}$

21. In the formula for finding the speed of waves in the string, unit of m in SI units is:
   (A) kg (B) kg-meter
   (C) kg/meter✓ (D) $\frac{\text{meter}}{\text{kg}}$

22. When the particles of the medium vibrate about their mean position, along the direction of motion of the waves, then the waves are called:
   (A) Longitudinal waves✓ (B) Transverse waves
   (C) Water waves (D) Complex waves

23. SI unit of wavelength is:
   (A) Kilometre (B) Metre✓
   (C) Centimetre (D) Hertz

24. The portion of the water above its mean level forms a:
   (A) Crest✓ (B) Trough
   (C) Both A and B (D) None of these

25. In transverse waves, the individual particles of the medium move:
   (A) In circles (B) Perpendicular to the direction of travel✓
   (C) Parallel to the direction of travel (D) None of these

26. Crests and troughs are formed in:
   (A) Longitudinal waves (B) Transverse waves✓
   (C) Both of these (D) None of these

27. Of the following, the option ______ reminds of longitudinal waves.
(A) Sound waves✓ (B) Heat waves
(C) Electromagnetic waves (D) Light waves

28. Which one of the following wave motions is transverse:
(A) Wave motion produced in water when a piece of stone is thrown into it✓ (B) Pulling of weight hanging vertically with a spiral spring
(C) Both of these (D) None of these

29. If one end of a rubber cord is fixed with a support and the other end is wiggled by hand, the waves generated on the card are:
(A) Stationary waves (B) Transverse waves✓
(C) Both of these (D) None of these

30. The wave motion set up in any medium depends upon:
(A) Elasticity (B) Inertia
(C) Density (D) All of these✓

31. Transverse wave motion is possible in:
(A) Air (B) A mixture of NH_3 and O_2
(C) Strings✓ (D) All of these

32. If $\lambda = 1$ cm, time period = 0.02 seconds, then velocity of the wave will be:
(A) 100 cm sec^{-1} (B) 50 cm sec^{-1}✓
(C) 0.6 m sec^{-1} (D) 20 cm sec^{-1}

33. For transmission of both transverse and longitudinal waves, we can use:
(A) Solid✓ (B) Gas
(C) Plasma (D) None of these

34. The distance between two consecutive rarefactions (elongations) is called:
(A) Wavelength✓ (B) Frequency
(C) Amplitude (D) Displacement

35. Which one of the following wave motions is longitudinal:
(A) One end of a string is fixed and the other is wiggled (B) A piece of stone is thrown into still water.
(C) Pulling of weight hanging vertically with a spinal spring✓ (D) Both A and C

SPEED OF SOUND

36. Sound waves cannot propagate through:
(A) Walls (B) Grass
(C) Wood (D) Vacuum✓

37. Experimental value of speed of sound in air at 0°C is:
(A) 280 m/sec (B) 320 m/sec
(C) 332 m/sec✓ (D) 340 m/sec

38. The distance covered by sound waves in air at 0°C in the time of 0.1 seconds is:
(A) 332 m (B) 33.2 m✓
(C) 3.32 m (D) 3320 m

39. Speed of sound in a gas is:
(A) Directly proportional to absolute temperature (T) (B) Inversely proportional to T
(C) Directly proportional to square root of T✓ (D) Directly proportional to square of T

40. The ultrasonics have the frequencies:
(A) In the audible range (B) Above 20,000 Hz✓
(C) Below 20 Hz (D) None of these

41. A sound of frequency 5 Hz:
(A) Has very small wavelength (B) Is very small
(C) Is inaudible✓ (D) Is very loud

42. The speed of sound is greatest in:
(A) Air (B) Steel✓
(C) Ammonia (D) Water

43. Frequencies less than 20 hertz are called:
(A) Supersonics (B) Ultrasonics
(C) Panasonics (D) Infrasonics✓

44. Speed of sound is _______ pressure.
(A) Independent of✓ (B) Directly proportional to
(C) Inversely proportional to (D) Equal to

45. In space, sound waves cannot travel because there is:
(A) Air (B) Gravity
(C) Light (D) Vacuum✓

46. Sound waves having frequencies between 2KHz and 4 KHz are called:
(A) Infrasonics (B) Ultrasonics✓
(C) Threshold of hearing (D) None of these

47. The ratio of speed of sound in hydrogen to the speed of sound in oxygen is:
(A) 4:1✓ (B) 1:4
(C) 8:1 (D) 1:8

48. Laplace assumed that sound travels in gases under:
(A) Isothermal condition (B) Adiabatic condition✓
(C) Isochoric condition (D) None of them

49. The value of γ for air is:
(A) 1.6 (B) 2.6
(C) 1.4✓ (D) 2.4

50. One degree Celsius _______ in temperature produces approximately 0.61 m/sec _____ in the speed of sound.
(A) Fall, decrease✓ (B) Rise, decrease
(C) Fall, increase (D) None of them

51. Speed of sound and their densities at temperatures of 0°C and t°C are related by:
(A) $\frac{v_o}{v_t} = \sqrt{\frac{\rho_o}{\rho_t}}$ (B) $\frac{\rho_o}{\rho_t} = \sqrt{\frac{v_o}{v_t}}$
(C) $\frac{v_o}{v_t} = \sqrt{\frac{\rho_t}{\rho_o}}$✓ (D) None of these

52. Binomial expansion converts $\sqrt{1+\frac{t}{273}}$ into as follows:
(A) $1+\frac{t}{546}$✓ (B) $1+\frac{2t}{273}$
(C) $2+\frac{t}{546}$ (D) None of these

53. Through which medium sound waves travel faster?
(A) CO_2 (B) H_2✓
(C) O_2 (D) He

54. The frequency range for human ear is:
(A) 20 KHz-20,000 KHz (B) 20-20,000 Hz✓
(C) 20-20,000 Mhz (D) None of these

55. Two degree Celsius rise in temperature of the medium, produces approximately increase in the speed of sound equal to:

(A) 0.61 cm/sec (B) 0.61 m/sec
(C) **1.22 m/sec✓** (D) 0.61 mm/sec

56. **Sound waves can travel only through:**
(A) Non-metals (B) Vacuum
(C) **Material medium✓** (D) None of these

57. **Speed of sound in vacuum (in m/sec) is:**
(A) 330 (B) **Zero✓**
(C) 156 (D) 1000

58. **Sound waves are:**
(A) Stationary waves (B) Transverse waves
(C) **Longitudinal waves✓** (D) None of these

59. **Sound waves can propagate through:**
(A) Solids (B) Liquid
(C) Gas (D) **All of them✓**

60. **Speed of sound in air at room temperature (say 20°C) is nearly:**
(A) 332 m sec^{-1} (B) **344 m sec^{-1}✓**
(C) 1087 m sec^{-1} (D) None of these

61. **When the wind is blowing in the same direction in which the sound is travelling, the speed of sound will:**
(A) Decrease (B) **Increase✓**
(C) Remain unchanged (D) None of these

62. **A supersonic plane flies with the speed ______ speed of sound.**
(A) Less than (B) Equal to
(C) **Greater than✓** (D) None of these

63. **If the atmospheric pressure is doubled, the speed of sound:**
(A) Increases by 61 cm sec^{-1} (B) Decreases by 61 cm sec^{-1}
(C) **Remains constant✓** (D) None of these

64. **At what temperature, the speed of sound in air is double its value at 0°C:**
(A) 1090°C (B) **819°C✓**
(C) 546°C (D) 273°C

65. **For gases having the same value of r, the speed of sound is inversely proportional to:**
(A) **Square root of density✓** (B) Square of density
(C) Density (D) None of them

66. **The speed of sound in air at 4 atmospheres and that at 1 atmosphere pressure will be:**
(A) 1:4 (B) 4:1
(C) **1:1✓** (D) 3:1

67. **Of the following gases, under similar conditions of temperatures and pressures, the speed of sound will be maximum in:**
(A) **Hydrogen✓** (B) Oxygen
(C) CO_2 (D) None of these

PRINCIPLE OF SUPERPOSITION, INTERFERENCE & BEATS

68. **Principle of superposition of waves uses the property of ______ for displacements of waves.**
(A) **Addition✓** (B) Multiplication
(C) Division (D) None of these

69. **Two identical tuning forks emitting sound waves in the same direction, will produce ______.**
(A) Beats (B) Stationary waves
(C) **Interference✓** (D) Resonance

70. **For destructive interference of two waves, the path difference between them is:**
(A) Zero (B) **$\lambda/2$✓**
(C) λ (D) 2λ

71. When crest and trough of one wave falls respectively over the crest and trough of other wave, then it is type of:
   (A) Constructive Interference✓ (B) Destructive interference
   (C) Any of them (D) None of them

72. It becomes difficult to recognise beats when the difference between the frequencies of two sounds is more than:
   (A) 2 Hz (B) 5 Hz
   (C) 6 Hz (D) 10 Hz✓

73. If the difference between frequencies of the tuning forks is n, then number of beats produced in two seconds are:
   (A) n (B) 2n✓
   (C) 3n (D) 4n

74. Two identical tuning forks vibrate at 256 c/sec. After loading one of them, 6 beats /sec are heard when forks are sounded together. The period of the loaded fork is:
   (A) 2×10^{-3} sec (B) 3×10^{-3} sec
   (C) 4×10^{-3} sec✓ (D) 0.006 sec

75. Is ΔS denotes the path difference and n = 0, ± 1, ± 2,........, the condition for destructive interference of waves is:
   (A) $\Delta S = (n+1)\frac{\lambda}{2}$ (B) $\Delta S = (n+\frac{1}{2})\lambda$
   (C) $\Delta S = (2n+1)\frac{\lambda}{2}$ (D) Both B and C are correct✓

76. The number of times we hear rises and falls of sound per second is called:
   (A) Beat (B) Time period
   (C) Frequency (D) Beat frequency✓

77. When the prongs of a tuning fork is filed, its frequency:
   (A) Increases✓ (B) Decreases
   (C) Remains unchanged (D) None of these

78. The effect of loading the prongs of a tuning fork with wax is to:
   (A) Increase the frequency (B) Decrease the frequency✓
   (C) Maintain the original frequency (D) All of these

79. Beats are the result of:
   (A) Constructive interference (B) Destructive interference
   (C) Both A and B✓ (D) Polarization

80. Interference can be produced with the help of two independent sources if the waves coming from them have same:
   (A) Time period (B) Phase✓
   (C) Wavelength (D) Amplitude

81. A tuning fork A of frequency 256 hertz produces 3 beats/sec with another tuning fork B. The frequency of tuning fork B is:
   (A) 256 (B) 253
   (C) 256 ± 3✓ (D) 259

82. The fork A of frequency 100 hertz is sounded with another tuning fork B. The number of beats produced is two. On putting some wax on the prong of B, the number of beats reduces to one. The frequency of fork B is:
   (A) 101 (B) 999
   (C) 98 (D) 102✓

83. The two sources are said to be coherent if they have same:
   (A) Intensity (B) Colour
   (C) Phase✓ (D) None of these

84. The path difference $\Delta S = n\lambda$ indicates that interference of two waves is:
(A) Constructive✓ (B) Destructive
(C) Either of the two (D) None of these

STATIONARY WAVES IN STRINGS AND AIR COLUMNS

85. In any medium, there can be produced stationary waves of:
(A) All frequencies (B) Discrete set of frequencies✓
(C) Continuous frequencies (D) None of these

86. A 100 cm long string fixed at its two ends is plucked from the middle. The wavelength of the stationary waves generated is:
(A) 0.5 m (B) 1 m
(C) 2 m✓ (D) 3 m

87. In a string, the fundamental frequency for standing waves is:
(A) $\frac{v}{\ell}$ (B) $\frac{\ell}{v}$
(C) $\frac{2\ell}{v}$ (D) $\frac{v}{2\ell}$✓

88. Given for (cylindrical) metal wire, $\rho = 10^3$ kg/m^3, diameter = 2mm, ℓ = 32 cm, find out its mass:
(A) 1 gram✓ (B) 10 gms
(C) 100 gms (D) 1 kg

89. The distance between two consecutive anti-nodes is:
(A) 2λ (B) λ
(C) $\frac{\lambda}{2}$✓ (D) $\frac{\lambda}{4}$

90. In standing waves pattern, the anti-nodes are the points of:
(A) Zero amplitude (B) Unit amplitude
(C) Minimum amplitude (D) Maximum amplitude✓

91. How many anti-nodes must be there between two nodes:
(A) Four (B) Three
(C) One✓ (D) Two

92. The nodal points are:
(A) Never at rest (B) Always at rest✓
(C) Sometimes at rest sometimes not (D) None of these

93. For producing standing waves, wire is plucked at the point one quarter of its length, then the number of nodes, anti-nodes and number of loops are respectively given as under:
(A) 3,2,3 (B) 2,2,3
(C) 2,3,2 (D) 3,2,2✓

94. In case of standing waves, as the string vibrates in more and more loops, its wavelength:
(A) Goes on increasing (B) Goes on decreasing✓
(C) Remains constant (D) None of these

95. Sound produced by an open end organ pipe contains:
(A) Only fundamental harmonic (B) Only odd harmonics
(C) Only even harmonics (D) All harmonics✓

96. Sound produced by a closed end organ pipe contains:
(A) Only the fundamental harmonic (B) Only odd harmonics✓
(C) Only even harmonics (D) All harmonics

97. In standing waves, if $\lambda = \frac{1}{2}$ in case of a string, then number of loops are:
(A) One (B) Two
(C) Three (D) Four✓

98. The open end of the tube in a resonance experiment, is taken as:
(A) Anti-node✓ (B) Node
(C) Any of them (D) None of them

99. The water level (surface) in the tube of resonance apparatus serves as:
(A) Anti-node (B) Node✓
(C) Both of them (D) None of them

100. In case of standing waves produced in the string, f_1 is _______ the f_2.
(A) Same as (B) Double than
(C) Half of✓ (D) None of the above

101. In case of standing waves producing in organ pipes, fundamental frequency in case of open end pipe is _______ that in case of closed end pipe.
(A) Same as (B) Double than✓
(C) Half of (D) None of above

102. Which type of organ pipe is richer in harmonics?
(A) Open at both ends✓ (B) Closed at one end
(C) Closed at both ends (D) None of these

103. A wave is a stretched string has a velocity of 10 m sec^{-1} and a frequency of 100 hertz. The wavelength of this wave is:
(A) 1 m (B) 10 cm✓
(C) 10 m (D) 1 cm

104. In stationary waves, energy is:
(A) Uniformly distributed (B) Maximum at nodes
(C) Maximum at anti-nodes✓ (D) None of these

105. The wavelength of sound produced by an open end organ pipe in nth mode is:
(A) $\frac{2l}{n}$✓ (B) 2nl
(C) 2n + 1 (D) None of these

106. A 4 m long string fixed at its ends resonate in 4 segments. The wavelength of the wave is:
(A) 4 m (B) 2 m✓
(C) 0.5 m (D) 0.25 m

107. The wavelength of the fundamental mode of vibration of a closed end (one end closed) pipe is:
(A) 2l (B) l
(C) $\frac{l}{2}$ (D) 4l✓

108. The waves having a discrete set of frequencies can be set up in a medium. This fact is known as:
(A) Conservation of frequencies (B) Quantization of frequencies✓
(C) Damping of frequencies (D) None of these

109. The distance equal to one-fourth of a wavelength is between:
(A) Two consecutive nodes (B) Two consecutive anti-nodes
(C) Between consecutive node and anti-node✓ (D) None of these

110. A vibrating air column open at both ends contains two nodes and is in resonance with a tuning fork. The length of air column in terms of λ is:
(A) λ✓ (B) 2λ
(C) $\frac{\lambda}{2}$ (D) $\frac{\lambda}{4}$

111. With the increase in the stretched force of a wire, its frequency:
(A) Increases✓ (B) Decreases
(C) Remains constant (D) None of these

112. The least distance between node and consecutive anti-node is:
 (A) λ (B) 2λ
 (C) $\frac{\lambda}{2}$ (D) $\frac{\lambda}{4}$✓

113. When two waves moving along the same line coming from opposite directions superpose each other, then ______ are produced.
 (A) Beats (B) Stationary waves✓
 (C) Either of the two (D) None of these

114. When a string of length l fixed at both ends is plucked from the middle, the string vibrates:
 (A) 3 loops (B) 1 loop✓
 (C) 4 loops (D) 2 loops

115. A resonating air column contains:
 (A) Stationary longitudinal waves✓ (B) Longitudinal progressive waves
 (C) Stationary transverse waves (D) None of these

116. When length and diameter of a wire is increased, and is stretched, then its frequency:
 (A) Increases (B) Decreases✓
 (C) Remains same (D) None of these

117. In a stretched string, the speed of wave is independent of:
 (A) Tension (B) Total mass of string
 (C) Length of wire (D) The point from where the string is plucked✓

118. A stretched string fixed at both ends vibrates in n loops. Its length in terms of wavelength is:
 (A) N λ (B) $n\frac{\lambda}{2}$✓
 (C) $n\frac{\lambda}{2}$ (D) None of these

119. If the string of length l, fixed at both ends, is plucked from one quarter of its length, then the wavelength of the wave generated is given by:
 (A) $\lambda = \ell$✓ (B) $\lambda = 2\ell$
 (C) $\lambda = \frac{\ell}{2}$ (D) $\lambda = 0$

120. The fixed ends of a vibrating string are called:
 (A) Overtones (B) Anti-nodes
 (C) Nodes✓ (D) None of these

121. If a string is vibrated in n loops, then the wavelength of the waves set up in the string will be given by the relation:
 (A) $\lambda_n = \frac{2}{n}\ell^2$ (B) $\lambda_n = \frac{2}{n}\ell$✓
 (C) $\lambda_n = \frac{n}{2\ell}$ (D) None of these

122. The minimum length of an open end organ pipe to set up stationary waves is:
 (A) $\frac{v}{2f}$✓ (B) $\frac{2v}{f}$
 (C) $\frac{v}{f}$ (D) 2vf

123. Energy is not carried by:
 (A) Transverse progressive wave (B) Longitudinal progressive wave
 (C) Stationary wave✓ (D) All of these

124. A vibrating string under certain tension produces 100 vibrations per second. When the tension is increases 4 times, the number of vibrations per second will become:

(A) 400 (B) 300
(C) 250 (D) 200✓

125. **It is desired to increase the frequency of a vibrating string from 50 hertz to 200 hertz. This can be done by increasing the tension of the string:**
(A) 4 times (B) 8 times
(C) 16 times✓ (D) None of these

126. **The distance equal to half the wavelength is equal to the distance between:**
(A) Two nodes (B) Two anti-nodes
(C) Either of two✓ (D) None of these

127. **The ratio of the fundamental frequency of an open end and closed end organ pipes of the same length is:**
(A) 2:1✓ (B) 1:2
(C) 1:1 (D) 4:1

128. **One of the differences between an open end and closed end organ pipes is:**
(A) Closed end organ pipe has all possible harmonics (B) **Open end pipe has all harmonics but closed end pipe has only odd harmonics**✓
(C) Open end pipe has only odd harmonics (D) None of these

REFLECTION OF WAVES AND DOPPLER'S EFFECT

129. **A pulse on a string is inverted when it is reflected from:**
(A) A fixed end✓ (B) A free end
(C) Either of the ends (D) None of these

130. **A crest travelling in a rarer medium is reflected from a denser medium as _______ and thus a phase difference of _______ takes place.**
(A) Crest, 180° (B) Trough, 90°
(C) Crest, 90° (D) **Trough, 180°**✓

131. **A trough travelling in a denser medium is reflected from a rarer medium as _______ and thus phase difference of _______ takes place.**
(A) **Trough, 0°**✓ (B) Crest, 180°
(C) Crest, 0° (D) Trough, 180°

132. **The arrangement of visible colours is given by:**
(A) VIBYGOR (B) **VIBGYOR**✓
(C) VIGBYOR (D) VIRGOBY

133. **If the distant star is receding from us, the spectral lines from such a star when examined on Earth will show:**
(A) No shift in frequency (B) **A shift in frequency towards the red end**✓
(C) A shift in frequency towards the violet end (D) None of them

134. **The wavelength of light coming from a star shifts towards the violet end of the spectrum. This shows that the star is:**
(A) **Approaching the Earth**✓ (B) Receding from the Earth
(C) Stationary (D) None of them

135. **A star emitting yellow light starts moving towards Earth. Its colours as seen from Earth with turn gradually:**
(A) **Blue**✓ (B) Red
(C) Orange (D) Dark

136. **Doppler's effect applies to:**
(A) Sound waves only (B) Light waves only

(C) Both A and B✓ (D) None of them

137. Reflection of Radar waves from the aeroplane is an example of:
(A) Resonance
(B) Doppler's effect✓
(C) Interference
(D) Beat phenomenon

138. In which case, Doppler's effect is used:
(A) Radar
(B) Sonar
(C) To find speed of stars
(D) All of these✓

139. If both the source and observer are stationary, then frequency of the waves received by the observer in one second can be obtained by:
(A) $f_o = \frac{v + u_o}{v} f$
(B) $f_o = \frac{v}{\lambda}$✓
(C) $f_o = \frac{v - u_o}{\lambda}$
(D) None of these

140. Doppler's shift in wavelength takes place when:
(A) Source is moving relative to observer
(B) Observer is moving relative to the source✓
(C) Source is at rest relative to observer
(D) Both the source and observer are at rest

141. One of the following results does not relate to any of the cases of Doppler's effect. Tick the wrong result:
(A) $\frac{v + u_o}{v} f$
(B) $\frac{v - u_o}{\lambda}$
(C) $\frac{v + u_s}{v} f$✓
(D) $\frac{v}{v \pm u_s} f$

142. Radar waves are sent towards a moving aeroplane and the reflected waves are received by the radar. When aeroplane is moving towards the radar. Then wavelength of reflected wave:
(A) Decreases✓
(B) Increases
(C) Remains constant
(D) None of these

143. When a source of sound approaches a stationary listner, the frequency of sound heard by the listner is ______ that produced by the source.
(A) Less than
(B) Greater than✓
(C) Same as
(D) None of these

144. A person moves with a speed thrice the speed of sound waves towards the stationary source of sound. Then the frequency of sound waves heard by the person will:
(A) Increase 3 times
(B) Decrease 4 times
(C) Decrease 3 times
(D) Increase 4 times✓

145. When source of sound moves away from a stationary listner, frequency of sound heard by the listner is ______ that produced by the source.
(A) Less than✓
(B) Greater than
(C) Same as
(D) None of these

146. The wavelength of spectral lines of distant star appears to have shifted towards higher wavelength. Then the star is:
(A) At rest
(B) Moving away from the observer✓
(C) Moving towards the observer
(D) None of these

147. Doppler's effect is the change in the ______ of sound caused by the relative motion of the source and the listner.
(A) Velocity
(B) Frequency✓
(C) Amplitude
(D) Displacement

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Thermodynamics & Statistical Mechanics

KINETIC THEORY OF GASES

1. **Hotness or coldness of an object is represented in terms of:**
   (A) Heat (B) Temperature✓
   (C) Chemical energy (D) None of these
2. **Absolute zero is considered as that temperature at which:**
   (A) All liquids become gases (B) All gases become liquids✓
   (C) Water freezes (D) None of these
3. **When two objects come to common temperature, the body is said to be in:**
   (A) Static equilibrium (B) Dynamic equilibrium
   (C) Thermal equilibrium✓ (D) None of these
4. **A gas which strictly obeys the gas laws under all conditions of temperatures and pressure is called:**
   (A) Ideal gas✓ (B) Inert gas
   (C) Real gas (D) None of these
5. **Real gases strictly obey gas laws at:**
   (A) High pressures and low temperatures (B) Low pressures and high temperatures✓
   (C) High pressures & high temperatures (D) None of these
6. **At constant temperature, if the volume of a given mass of a gas is doubled, then the density of gas becomes:**
   (A) Double (B) Remains constant
   (C) Half✓ (D) None of these
7. **The only significant motion possessed by the mono-atomic gas molecules is:**
   (A) Translatory✓ (B) Rotatory
   (C) Vibratory (D) None of these
8. **In the theory of dimensional analysis, heat may be properly represented by:**
   (A) ML^2T^{-2}✓ (B) MT^{-2}
   (C) $ML^{-1}T^{1}$ (D) None of these
9. **The temperature scale approved in SI units is:**
   (A) Celsius scale (B) Kelvin scale✓
   (C) Fahrenheit scale (D) None of these
10. **Which of the following does not have the same units:**
    (A) Work (B) Heat
    (C) Kinetic energy (D) Power✓
11. **In an ideal gas, the molecules have:**
    (A) Kinetic energy only✓ (B) Potential energy only
    (C) Both KE and PE (D) None of these
12. **The motion of molecules in gases is:**
    (A) Orderly (B) Random✓
    (C) Circular (D) All of these
13. **At constant temperature, if the density of the gas is increased, its pressure will:**
    (A) Decrease (B) Increase✓
    (C) Remains unchanged (D) None of these
14. **Avogadro number is known as number of molecules in:**
    (A) One kg of a substance (B) Unit volume of a substance
    (C) One mole of a substance✓ (D) None of these
15. **The relationship between Boltzmann constant k with R and N_A is given as:**
    (A) $k = RN_A$ (B) $k = \frac{R}{N_A}$✓

(C) $k = \frac{NR}{N_A}$ (D) None of these

16. The nature of thermal radiation is similar to:
   (A) Ultraviolet rays (B) Light rays
   (C) Both of them✓ (D) None of them
17. Electromagnetic waves emitted by hot bodies are called:
   (A) Photoelectrons (B) Alpha rays
   (C) Thermal radiation✓ (D) None of these
18. Truth of kinetic theory is confirmed by:
   (A) Diffusion of gases (B) Brownian motion
   (C) Both A and B✓ (D) None of these
19. Pressure may be defined as _______ per second per unit area.
   (A) Change in force (B) Change in momentum✓
   (C) Change in energy (D) Work done
20. If a molecule with momentum mv strikes a wall and rebound then the change in momentum will be:
   (A) –2 mv✓ (B) Zero
   (C) 2 mv (D) mv
21. The rate of change of momentum of a molecule is equal to:
   (A) Pressure (B) Work
   (C) Density (D) Force✓
22. If N denotes the total number of molecules in a cubic vessel such that m is mass of each molecule and l is length of each side of vessel, then $\frac{mN}{l^3}$ gives the:
   (A) Force (B) Density✓
   (C) Work done (D) Pressure
23. Pressure applied at any point of the gas at rest is transmitted equally to all parts of the gas. This is the statement of:
   (A) Newton's second law (B) Pascal's law✓
   (C) Carnot theorem (D) Second law of thermodynamics
24. While deriving equation of pressure by kinetic theory of gases, we take into account:
   (A) Only linear motion of molecules✓ (B) Only rotational motion
   (C) Only vibratory motion (D) All of these
25. In the formula PV = nRT, n denotes:
   (A) Number of molecules per unit volume (B) Number of moles✓
   (C) Number of molecules (D) None of these
26. The value of universal gas constant R is:
   (A) 8.314 J/K mole K (B) 8314 J/mole K
   (C) 8.314 J/mole K✓ (D) None of these
27. In the formula $P = N_o KT$, N_o denotes:
   (A) Number of molecules per unit volume✓ (B) Number of moles
   (C) Number of molecules (D) None of these
28. Tick the correct pair when M denotes molecular mass and other symbols carry usual meanings:
   (A) $N = nN_A$, $m = MN_A$ (B) $n = N N_A$, $M = mN_A$
   (C) $M = \frac{N_A}{N}$, $N_A = \frac{m}{M}$ (D) $N = nN_A$, $M = mN_A$✓
29. Gas constant per molecule is called:
   (A) Universal gas constant (B) Stefen's constant
   (C) Boltzmann constant✓ (D) Gravitational constant
30. Root mean square velocity of a gas molecule in a vessel can be calculated as:

(A) $v = \sqrt{\frac{3m}{KT}}$ (B) $v = \sqrt{\frac{3KT}{m}}$✓
(C) $v = \sqrt{\frac{3T}{mK}}$ (D) $v = \frac{KT}{3m}$

31. Average KE of a gas molecule has:
(A) Direct relation with absolute temperature and inverse relation with pressure (B) Direct relation with both absolute temperature and pressure✓
(C) Inverse relation with both absolute temperature and pressure (D) None of these

32. While dealing with the processes in thermodynamics, the working substance is usually:
(A) Oxygen gas (B) Hydrogen gas
(C) Ideal gas✓ (D) None of these

33. Boltzmann's constant is actually:
(A) Gas constant per mole (B) Gas constant per kg
(C) Gas constant per molecule✓ (D) None of these

34. Change in momentum per second is:
(A) Product of force and time (B) Product of pressure and area✓
(C) Ratio of pressure and area (D) None of these

35. The pressure exerted on the walls of the vessel by the gas molecules is defined as:
(A) Force per unit volume (B) Energy per unit area
(C) Mass per unit volume (D) None of these✓

36. According to Boyle's law, volume of a given mass of a gas is:
(A) Inversely proportional to mass at constant pressure (B) Directly proportional to pressure at constant temperature
(C) Inversely proportional to pressure at constant temperature✓ (D) None of these

37. Brownian motion confirms the truth of:
(A) Wave theory of light (B) Boyle's law
(C) Kinetic theory of gases✓ (D) Adiabatic process

38. The number of molecules in one mole of a gas is equal to:
(A) Avogadro number N_A✓ (B) Gas constant R
(C) Boltzmann constant k (D) None of these

39. The temperature at which all the gases become liquid is called:
(A) 273 K (B) Absolute zero✓
(C) –273 K (D) Both B and C

40. For a gas obeying Boyle's law, if the pressure is doubled the volume becomes:
(A) One half✓ (B) Double
(C) Four times (D) None of these

41. Thermal radiations are a type of:
(A) Mechanical waves (B) Electromagnetic waves✓
(C) Alpha rays (D) Electrons

42. An ideal gas obeys gas laws at:
(A) Low temperatures and high pressures (B) High temperatures and low pressures
(C) All temperatures and pressures✓ (D) None of these

43. According to Charles' law, volume of a given mass of a gas is:
(A) Inversely proportional to temperature at constant pressure (B) Directly proportional to pressure at constant temperature
(C) Directly proportional to temperature at constant pressure✓ (D) None of these

44. S.T.P. means:
(A) 0°K and 760 cm of Hg (B) 0°C and 760 mm of Hg✓

(C) 0°K and 760 mm of Hg (D) None of these

FIRST LAW OF THERMODYNAMICS

45. When a gas is compressed:
    (A) Its internal energy decreases (B) Its temperature decreases
    (C) Its temperature increases✓ (D) None of these
46. In thermodynamics, the change in internal energy depends upon:
    (A) The path taken between initial and final states (B) The initial state only
    (C) The final state only (D) Initial and final states✓
47. First law of thermodynamics is merely a statement of law of conservation of:
    (A) Energy✓ (B) Angular momentum
    (C) Charge (D) Linear momentum
48. In an isothermal process, the internal energy of the system:
    (A) Increases (B) Decreases
    (C) Remains constant✓ (D) None of these
49. First law of thermodynamics when applied to an adiabatic process becomes:
    (A) $W = \Delta u$ (B) $W = Q$
    (C) $Q = \Delta U$ (D) $W = -\Delta U$✓
50. In which process, the change in internal energy of the system is zero:
    (A) Isochoric process (B) Isobaric press
    (C) Adiabatic process (D) Isothermal process✓
51. When a substance is heated, heat is converted into:
    (A) Chemical energy (B) Internal energy✓
    (C) Potential energy (D) None of these
52. The increase in temperature of an object is an indication of:
    (A) Decrease in KE only (B) Increase in its P.E only
    (C) Increase in its internal energy✓ (D) None of these
53. Tick which of the following is not a state variable?
    (A) Heat energy✓ (B) Pressure
    (C) Entropy (D) Volume
54. If an amount of heat Q enters the system:
    (A) It causes an increase in internal energy (B) A certain quantity of work is done
    (C) Both A and B are correct✓ (D) None of these
55. If P is the pressure and V is the volume, then PV will represent:
    (A) Power (B) Work✓
    (C) Force (D) None of these
56. If A is the area and Δy is the distance moved by the piston, then $A\Delta y$ will represent:
    (A) Change in pressure (B) Density
    (C) Change in volume✓ (D) None of them
57. The equation $\Delta U = Q - W$ is the statement of ______ law of thermodynamics.
    (A) First✓ (B) Second
    (C) Third (D) None
58. Given that $P = 10^4$ N/m², Area of the piston = 0.1 m² and distance moved by the piston = 10^{-1} cm, then the work done by the gas is:
    (A) 1 J✓ (B) 10^5 J
    (C) 10^4 J (D) 10 J
59. The equation $W = -\Delta U$ represents:
    (A) Isothermal process (B) Adiabatic process✓
    (C) Isobaric process (D) None of these
60. The example/s of an adiabatic process is/are:
    (A) The rapid escape of air from a burst cycle (B) Cloud formation in the atmosphere

(C) Both A and B✓ (D) None of these

61. The equation PV^{γ} = constant applies to:
(A) Isothermal process (B) Adiabatic process✓
(C) Isobaric process (D) None of above

62. In equation PV^{γ} = constant, r is defined as:
(A) $r = \frac{C_p}{C_v}$✓ (B) $r = \frac{C_v}{C_p}$
(C) $r = C_p - C_v$ (D) None of these

63. Suppose volume of gas in a cylinder is 3 c.c. If the piston is kept fixed and gas is heated from 5°C to 12°C, then the work done is:
(A) 2.3 J (B) 21 J
(C) Zero✓ (D) None of these

64. If C_v denotes molar specific heat at constant volume and ΔT is the change in temperature, then C_v ΔT gives:
(A) Volume (B) Pressure
(C) Energy✓ (D) Entropy

65. $C_v - C_p$ and $\frac{C_v}{C_p}$ are respectively equal to:
(A) $\frac{1}{R}, r^{-1}$ (B) $+R, \frac{1}{r}$
(C) R, r (D) $-R, r^{-1}$✓

66. A process in which no heat enters or leaves the system is called:
(A) Adiabatic process✓ (B) Isothermal process
(C) Isochoric process (D) None of these

67. A process which is carried at constant temperature and Boyle's law can be applied is called:
(A) Adiabatic process (B) Isothermal process✓
(C) Isochoric process (D) None of these

68. When a gas is compressed isothermally, the product of its pressure and volume during the process:
(A) does not remain (B) is proportional to entropy
(C) remains constant✓ (D) is zero

69. Thermodynamics is the study of relationship between:
(A) Heat and surroundings (B) Heat and other forms of energy✓
(C) Heat and liquid (D) None of these

70. If A is the area of the piston and Δy is the distance moved by the piston, then change in volume is expressed by:
(A) $\frac{A}{\Delta y}$ (B) $\frac{\Delta y}{A}$
(C) A + Δy (D) AΔy✓

REVERSIBLE AND IRREVERSIBLE PROCESS

71. Work done against friction is an example of:
(A) A reversible process (B) An irreversible process✓
(C) Adiabatic process (D) None of these

72. Tick the examples of a reversible process:
(A) Work done by friction and explosion (B) Work done by friction and liquefaction
(C) Evaporation and liquefaction✓ (D) Evaporation and explosion

73. Tick the examples of an irreversible process:
(A) Evaporation and liquefaction (B) Work done by friction and explosion✓

(C) Work done by friction and liquefaction
(D) Explosion and evaporation

SECOND LAW OF THERMODYNAMICS AND CARNOT ENGINE

74. **If the temperature difference between hot and cold body is greater, the heat engine is:**
(A) Not efficient
(B) Less efficient
(C) More efficient✓
(D) None of above

75. **Steam engine is:**
(A) An optical system
(B) A thermal system
(C) A thermodynamic system✓
(D) None of these

76. **The law of thermodynamics which discusses the condition under which heat energy is converted into an equivalent amount of work is:**
(A) 1^{st}
(B) 2nd✓
(C) 3^{rd}
(D) None of these

77. **As the working substance of a heat engine completes a cycle, there is no change in:**
(A) Internal energy
(B) Pressure
(C) Volume
(D) None of these
(E) All of these✓

78. **_____ the temperature difference of two reservoirs, _______ is the efficiency of a heat engine.**
(A) Larger, smaller
(B) Larger, greater✓
(C) Smaller, greater
(D) None of these

79. **In a Carnot engine, at the end of the cyclic process, the temperature of the working substance is:**
(A) Zero
(B) Equal to the initial temperature✓
(C) Greater than initial temperature
(D) Smaller than initial temperature

80. **Carnot cycle is:**
(A) Reversible✓
(B) Irreversible
(C) Sometimes A, sometimes B
(D) None of these

81. **The efficiency of a Carnot engine depends upon:**
(A) Temperature of source only
(B) Temperature of source and sink✓
(C) Nature of the working substance
(D) Both B and C

82. **The ratio of output work per cycle to input energy per cycle is called:**
(A) Entropy
(B) Internal energy
(C) Efficiency✓
(D) None of these

83. **What will be efficiency of a carnot engine when it is operated between the temperatures 47°C and 127°C:**
(A) 20%✓
(B) 50%
(C) 60%
(D) 75%

84. **If temperature of the sink is decreased, efficiency of a carnot engine:**
(A) Remains constant
(B) Decreases
(C) Increases✓
(D) None of these

85. **Carnot engine is _______ heat engine.**
(A) A reversible
(B) An irreversible
(C) An ideal
(D) Both A and C are correct✓
(E) Both B and C are correct

86. **The efficiency of a practical heat engine:**
(A) Can be 100%
(B) Cannot be 100%✓
(C) Is always zero
(D) None of these

87. **Efficiency of a heat engine is defined as:**
(A) Ratio of input energy per cycle to the output work per cycle
(B) Product of input energy and output work
(C) Ratio of output work per cycle to
(D) None of these

the input energy per cycle✓

88. Efficiency of a heat engine increases if:
(A) Temperature of sink is decreased✓ (B) Temperature of source is decreased
(C) Temperature of sink is increased (D) Both B and C

THERMODYNAMIC SCALE OF TEMPERATURE

89. One degree of thermodynamic scale is equal to ________ of the temperature of triple point of water.
(A) $\frac{1}{273}$ th (B) $\frac{1}{100}$ th
(C) $\frac{1}{273.16}$ th✓ (D) $\frac{1}{32}$ th

90. The unknown temperature T on thermodynamic scale in kelvin is given by the formula:
(A) $T = 273.16\frac{Q}{Q_3}$✓ (B) $T = 32\frac{Q}{Q_3}$
(C) $T = 100\frac{Q}{Q_3}$ (D) $T = 273\frac{Q}{Q_3}$

91. One degree of thermodynamic scale of temperature is called:
(A) Celsius (B) Fahrenheit
(C) Kelvin✓ (D) Radian

92. Since thermodynamic scale ________ the property of the working substance, hence it can be applied at very ________ temperature.
(A) Depends upon, low (B) Is independent of, low✓
(C) Depends upon, high (D) None of them

PETROL AND DIESEL ENGINES

93. Petrol engine converts ________ of available heat energy into work.
(A) 20% to 25% (B) 25% to 30%✓
(C) 30% to 35% (D) 35% to 40%

94. Diesel engine converts ________ of available heat energy into work.
(A) 20% to 25% (B) 25% to 30%
(C) 30% to 35% (D) 35% to 40%✓

95. A certain engine converts 20% of available heat energy into work. Then its efficiency will be:
(A) 20%✓ (B) 80%
(C) 50% (D) None of these

96. Number of spark plugs needed in diesel engine is:
(A) Four (B) Five
(C) Six (D) None of these✓

97. Most motorbikes have ________ cylinder/s engine but cars usually have ________ cylinders on the same crankshaft.
(A) Four, six (B) One, four✓
(C) Two, five (D) None of these

ENTROPY AND ENVIRONMENT

98. Entropy measures the:
(A) Orderliness of a system (B) Disorder of the system✓
(C) Energy availability of the system (D) None of these

99. All natural processes proceed towards a state of:
(A) No change in entropy (B) Decrease in entropy
(C) Increase of entropy✓ (D) None of these

100. When the disorder of the state of system increases, its entropy:
(A) Increases✓ (B) Decreases
(C) Remains constant (D) None of these

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Electromagnetism Theory

Select the correct answer and encircle it.

MAGNETIC FIELD DUE TO CURRENT

1. When some compass needles are placed on a card board along a circle with the centre at the wire, they will:
   (A) Point in the direction of N-S✓
   (B) Set themselves tangential to the circle
   (C) Point in the direction of E-W
   (D) Point in the direction of S-E
   (E) None of these
2. In the region surrounding a current carrying wire:
   (A) A magnetic field is set up
   (B) The lines of force are elliptical
   (C) Direction of lines of force depends upon direction of current
   (D) Both (A) and (C)✓
   (E) All of these
3. A current carrying conductor sets up its own:
   (A) Electric field (B) Nuclear field
   (C) Magnetic field (D) All of these
   (E) Both (A) and (C)✓
4. It is customary to represent a current flowing towards the reader by a symbol:
   (A) (×) (B) (+)
   (C) (.)✓ (D) (–)
   (E) (+)
5. The direction of force on a current carrying conductor placed in a magnetic field is that of:
   (A) Length of conductor (B) Magnetic field
   (C) $\vec{L} \times \vec{B}$ ✓ (D) $\vec{L} . \vec{B}$
   (E) None of these
6. The pointer of a magnetic compass:
   (A) Is affected only by permanent magnets
   (B) Aligns itself parallel to the applied magnetic field✓
   (C) Vibrates in the magnetic field of the current
   (D) Aligns itself perpendicular to the magnetic field
   (E) Both (C) and (D)
7. Magnetic field is a:
   (A) Vector quantity✓ (B) Scalar quantity
   (C) Scalar as well as vector quantity (D) Neither (A) nor (B)
   (E) Any of (A) or (B)
8. The direction of magnetic lines of force around a current carrying wire is given by:
   (A) Faraday's law (B) Head to tail rule
   (C) Right hand rule✓ (D) Both (A) and (B)
   (E) None of these
9. If a copper rod carries a direct current, the magnetic field associated with the current will be:
   (A) Only inside the rod (B) Only outside the rod
   (C) Both inside and outside the rod✓
   (D) Neither inside nor outside the rod
   (E) None of these
10. The force on a current carrying conductor of length $\vec{L}$ placed in a magnetic field $\vec{B}$ depends

upon:
(A) Angle between $\vec{L}$ and $\vec{B}$
(B) Current passing through the conductor
(C) Length and magnetic field✓
(D) Both (A) and (C) only
(E) All of these

11. Magnetic lines of force:
(A) Cannot intersect at all✓
(B) Intersect at infinity
(C) Intersect within magnet
(D) Intersect at neutral points
(E) None of these

12. The strength of magnetic field around a straight conductor:
(A) Is same every where around the conductor
(B) Obeys inverse square law
(C) Is directly proportional to the square of distance from the conductor
(D) All are true
(E) None of these✓

13. A current is passed through a straight wire. The magnetic field established around it has its lines of force:
(A) Circular and endless✓
(B) Oval in shape and endless
(C) Straight
(D) Parabolic
(E) All are true

14. If current carrying conductor is placed perpendicular to the magnetic field, it will experience a force:
(A) Zero
(B) ILB cos α
(C) ILB✓
(D) Both (A) and (B)
(E) Both (B) and (C)

15. The direction of force experienced by a current carrying conductor placed in a magnetic field B is found by:
(A) Dot product at $\vec{L}$ and $\vec{B}$
(B) Cross product of $\vec{L}$ and $\vec{B}$
(C) Right hand rule
(D) Both (B) and (C) ✓
(E) Both (A) and (C)

MAGNETIC FLUX, FLUX DENSITY, AMPERE'S LAW

16. If $\vec{A}$ is vector area and $\vec{B}$ is the magnetic field, the magnetic flux is mathematically defined as:
(A) $\vec{A} \cdot \vec{B}$
(B) $\vec{A} \times \vec{B}$
(C) $\vec{B} \cdot \vec{A}$
(D) Both (A) and (B)
(E) Both (A) and (C) ✓

17. Vector area $\vec{A}$ is a vector whose direction:
(A) Is along the surface element
(B) Perpendicular to surface element✓
(C) At an angle 60° to the surface element
(D) Depends upon the direction of magnetic field
(E) None of these

18. If the field is directed along the normal to the area, then flux is:
(A) Maximum
(B) Equal to zero
(C) Equal to BA
(D) Minimum

(E) **Both (A) and (C)✓**

19. **The unit of magnetic induction $\vec{B}$ is:**
(A) Weber
(B) Web m^{-2}✓
(C) Newton/amp. metre
(D) Newton/metre
(E) None of these

20. **Magnetic induction is defined as flux per unit area of the surface which is:**
(A) Parallel to $\vec{B}$
(B) **Perpendicular to $\vec{B}$✓**
(C) At an angle 60° to B
(D) Any of A or B
(E) Both (A) and (C)

21. **Magnetic induction is also called:**
(A) Magnetic flux
(B) Magnetic flux density
(C) Magnetic field strength
(D) Both (A) and (B)
(E) **Both (A) and (C)✓**

22. **Magnetic field strength is measured in terms of:**
(A) Web m^{-2}
(B) Tesla
(C) $NA^{-1}m^{-1}$
(D) All of above✓
(E) NAm^{-1}

23. **Given that $\vec{B} = 40\hat{i} - 18\hat{k}$. The vector $\vec{B}$ lies in:**
(A) XY plane
(B) YZ plane
(C) **XZ plane✓**
(D) Any of these
(E) None of these

24. **Tesla can also be written as:**
(A) NAm^{-1}
(B) $NA^{-1}m^{-1}$✓
(C) $N^{-1}Am^{-1}$
(D) $NA^{-1}m$
(E) None of these

25. **Magnetic flux density at any point due to current carrying conductor can be computed by:**
(A) **Ampere's law✓**
(B) Faraday's law
(C) Lenz's law
(D) Newton's law
(E) Coulomb's law

26. **Amperean path is a:**
(A) Closed path
(B) Rectangular path
(C) Circular path
(D) **Any of above✓**
(E) Broken path

27. **μ_o is called:**
(A) Proportionality constant
(B) Permittivity of free space
(C) **Permeability of free space✓**
(D) Both (B) and (C)
(E) Both (A) and (C)

28. **Tesla is unit of:**
(A) Magnetic flux
(B) Electric flux
(C) **Flux density✓**
(D) Either (A) or (B)
(E) None of these

29. **A solenoid is a coil of wire which is:**
(A) Short, loosely wound, cylindrical
(B) Long, tightly wound, spherical
(C) Long, loosely wound, cylindrical
(D) **Long, tightly wound, cylindrical✓**
(E) None of these

30. The field is uniform and much stronger:
(A) Inside a long solenoid✓
(B) Outside a long solenoid
(C) At the end of a long solenoid
(D) At the central point of a long solenoid
(E) None of these

31. The formula $B = \mu_o nI$ is used to find magnetic field:
(A) At any point
(B) Along the axis of a solenoid✓
(C) At the ends of a solenoid
(D) All of these
(E) None of these

32. In the formula $B = \mu_o nI$, the symbol n denotes:
(A) Total number of turns of solenoid
(B) Number of turns per unit length✓
(C) Number of turns per unit volume
(D) Number of turns per unit area
(E) Number of moles

33. The unit of $n l_i I$ in case of solenoid is:
(A) Number of turns
(B) Ampere✓
(C) Metre
(D) Any of (A) or (B)
(E) Both (B) and (C)

34. Hold the solenoid in the right hand with fingers curling in the direction of current. The direction of the field will be given by:
(A) Thumb✓
(B) Curled fingers
(C) Middle finger
(D) Arm of right hand
(E) None of these

35. Total number of turns on 0.15 m length of solenoid is 300. The value of n is:
(A) Greater than 300✓
(B) Smaller than 300
(C) Equal to 300
(D) Any of (A) or (B)
(E) Any of (A) or (C)

36. The magnetic field inside a solenoid can be increased by:
(A) Increasing n
(B) Decreasing I
(C) Increasing I
(D) By using iron core within the solenoid
(E) All correct except B✓.

37. If the number of turns of a solenoid (carrying a steady current I) is doubled without changing the length of solenoid, then magnetic field:
(A) Becomes half
(B) Becomes double✓
(C) Is not affected
(D) Becomes one fourth
(E) None of these

38. The permeability of free space is measured in:
(A) Wb/Am✓
(B) Wb A/m
(C) Am/Wb
(D) m/Web A
(E) None of these

39. Strength of magnetic field is measured in SI units, in:
(A) N
(B) N/Am✓
(C) Am/N
(D) Nm/A
(E) None of these

40. NmA^{-1} is commonly called:

(A) Weber✓
(B) Ampere
(C) Gauss
(D) Coulomb
(E) None of these

41. **Ampere's law can be expressed as:**

(A) $\sum_{r=1}^{N}(\vec{B}.\vec{\Delta\ell})_r = \mu_o I$ ✓
(B) $\sum_{r=1}^{N}(\vec{E}.\vec{\Delta L})_r = \varepsilon_o I$
(C) $\vec{B}.\vec{\Delta L} = \mu_o A$
(D) $(\vec{E}\ .\ \vec{\Delta L})_r = \varepsilon_o I$
(E) None of these

42. **At a given instant, a proton moves in the +x direction in a region where there is magnetic field in the –z direction. The magnetic force on the proton will be the:**

(A) -y direction
(B) +y direction✓
(C) +z direction
(D) -z direction
(E) None of these

43. **Magnetic flux passing through an element of area A placed perpendicular to a uniform magnetic field B is:**

(A) Maximum✓
(B) Minimum
(C) Zero
(D) Very small
(E) None of these

44. **Magnetic flux passing an element whose vector area makes an angle 0° with lines of magnetic force is:**

(A) BA cos θ
(B) Zero
(C) BA✓
(D) BA sin θ
(E) None of these

45. **A long wire wound tightly on a cylindrical core is called:**

(A) Potentiometer
(B) Solenoid✓
(C) Toroid
(D) Wheat stone bridge
(E) None of these

46. **If the length of a solenoid (carrying a steady current I) is doubled without changing the number of turns, then magnetic field:**

(A) Becomes double
(B) Is not affected
(C) Becomes half✓
(D) Becomes four times
(E) None of these

MOTION OF CHARGED PARTICLES, E/M OF ELECTRON

47. **If there are n charge carriers per unit volume, then the number of charge carriers in a segment of wire of length L and area A is:**

(A) nA/L
(B) nAL✓
(C) AL/n
(D) n/AL
(E) None of these

48. **If an electron is projected in a magnetic field with a velocity v, it will experience a force which is given by:**

(A) $\vec{F} = e\vec{v} \times \vec{B}$
(B) $\vec{F} = e\vec{B} \times \vec{v}$ ✓
(C) $\vec{F} = \vec{v}e \times \vec{B}$
(D) $\vec{F} = e\vec{v}\ .\ \vec{B}$
(E) Any of these

49. **When the charged particle is projected at right angles to the field, then force experienced by it**

will be:

(A) Maximum
(B) Zero
(C) qvB✓
(D) Both (A) and (B)
(E) Both (A) and (C)

50. When a charged particle is projected in the direction of the field, then force experienced by it will be:

(A) qvB
(B) Zero✓
(C) Maximum
(D) Both (A) and (C)
(E) Both (A) and (B)

51. When an electric charge q is placed in an electric field, it will experience a force:

(A) Parallel to electric field✓
(B) Perpendicular to electric field
(C) At an angle 60° to electric field
(D) All of these
(E) None of these

52. If the charge is free to move in an electric field, then the acceleration produced in it is given by:

(A) $\frac{q}{mE}$
(B) $\frac{m}{qE}$
(C) $\frac{qE}{m}$ ✓
(D) $\frac{E}{mq}$
(E) None of these

53. When a charged particle is moving with certain velocity in a region where there is an electric field and magnetic field, then resultant force $\vec{F}$ on the charged particle is:

(A) $\vec{F} = \vec{F_e} + \vec{F_b}$ ✓
(B) $F = \vec{F_e} . \vec{F_b}$
(C) $\vec{F} = \vec{F_e} \times \vec{F_b}$
(D) $F = F_e / F_b$
(E) None of these

54. Lorentz force means force acting on a particle which is:

(A) Sum of electric and magnetic forces✓
(B) Electric force only
(C) Magnetic force only
(D) Product of electric and magnetic force only
(E) None of these

55. Magnetic force:

(A) Does work
(B) Does no work
(C) Is simply a deflecting force
(D) Both (A) and (B)
(E) Both (B) and (C)✓

56. Electric force:

(A) Is simply a deflecting force
(B) Does no work✓
(C) Does no work
(D) Both (A) and (B)
(E) None of these

57. The formula $\vec{F} = q\vec{v} \times \vec{B}$ Shows that $\vec{F}$ is:

(A) Perpendicular to $\vec{v} \times \vec{B}$ ✓
(B) Parallel to $\vec{v}$
(C) Perpendicular to $\vec{B}$
(D) All of above

(E) Parallel to $\vec{v} \times \vec{B}$

58. **Unit of evB is:**
(A) Coulomb (B) Ampere
(C) Newton✓ (D) Tesla
(E) Weber

59. **When an electron is projected in a direction perpendicular to the lines of magnetic force, its path becomes a:**
(A) Circle✓ (B) Straight line
(C) Parabola (D) Projectile
(E) None of these

60. **When an electron enters at right angles to a magnetic field, the magnitude of its velocity:**
(A) Increases (B) Decreases
(C) Remains unchanged✓ (D) Either (A) or (B)
(E) None of these

61. **The centripetal force experienced by an electron which enters in a magnetic field is provided by:**
(A) Charge on the electron (B) Velocity of the electron
(C) Magnetic field (D) All of these✓
(E) None of these

62. **The value of e/m of an electron can be found if we know value of:**
(A) Its velocity
(B) Magnetic force applied
(C) Radius of the electronic trajectory
(D) Both (B) and (C)✓
(E) All of these

63. **The apparatus which makes the electronic trajectory visible uses:**
(A) Nitrogen at low pressure
(B) Hydrogen at low pressure✓
(C) Oxygen at high pressure
(D) Hydrogen at high pressure
(E) None of these

64. **Velocity of an electron accelerated by a potential difference V can be found by:**
(A) $\frac{2Ve}{m}$ (B) $\frac{m}{2Ve}$
(C) $\sqrt{\frac{2Ve}{m}}$✓ (D) $\frac{2V}{me}$
(E) None of these

65. **The value of e/m of an electron can be found by the equation:**
(A) $\frac{v}{Br}$ (B) $\frac{2V}{B^2r^2}$
(C) $\frac{2Ve}{m}$ (D) Both (A) and (B)✓
(E) Both (A) and (C)

66. **Knowing v, B and e/m of an electron, the radius of its orbit can be found by:**
(A) $\frac{mv}{eB}$✓ (B) $\frac{e}{m} \times \frac{v}{B}$
(C) $\frac{m}{e} \times \frac{B}{v}$ (D) $\frac{e}{m} \times \frac{B}{v}$
(E) None of these

67. **Velocity selector is a device in which a charged particle experiences an electric and a magnetic**

field acting:
- (A) Parallel to each other
- (B) Perpendicular to each other✓
- (C) At an angle 60° with each other
- (D) Any of above
- (E) None of these

68. Alpha particles are made to pass through a device called velocity selector. The velocity of α-particles can be found by:
- (A) $v = EB$
- (B) $v = E/B$✓
- (C) $v = B/E$
- (D) $v = E + B$
- (E) None of these

69. Unit of E is NC^{-1} and that of B is $NA^{-1}m^{-1}$. The unit of $\frac{E}{B}$ comes out to be:
- (A) ms^{-2}
- (B) kg
- (C) ms^{-1}✓
- (D) ampere
- (E) None of these

70. If n, A, q, v bears usual meanings, then unit of nAqv is:
- (A) Weber
- (B) Tesla
- (C) Ampere✓
- (D) Coulomb
- (E) None of these

CATHODE RAY OSCILLOSCOPE

71. CRO means:
- (A) Cathode ray oscillograph
- (B) Current rectification and oscillation
- (C) Central registration office
- (D) Cathode ray oscilloscope✓
- (E) None of these

72. CRO is a:
- (A) High speed graph plotting device
- (B) Low speed moving device
- (C) Device to display wave form of given voltage
- (D) Both (B) and (C)
- (E) Both (A) and (C) ✓

73. CRO works by deflecting the beam of electrons as they pass through:
- (A) Uniform electric field between two sets of parallel plates✓
- (B) Non uniform magnetic field
- (C) Three sets of parallel plates
- (D) Uniform magnitude field
- (E) Both (C) and (D)

74. Electrons are also called:
- (A) Positive rays
- (B) Neutral rays
- (C) Cathode rays✓
- (D) Both (A) and (B)
- (E) Both (B) and (C)

75. An electron gun consists of:
- (A) Indirectly heated cathode and a grid
- (B) Three anodes
- (C) Directly heated cathode
- (D) Both (A) and (B)✓
- (E) Both (B) and (C)

76. Indirectly heated cathode means that the:

(A) Cathode heats the filament
(B) Grid heats the filament
(C) **Filament heats the cathode✓**
(D) Any of these
(E) None of these

77. **The anodes in CRO are at:**
(A) **Higher potential w.r.t. cathode✓**
(B) Lower potential w.r.t. cathode
(C) Same potential as cathode
(D) Any of these
(E) None of these

78. **The anodes in CRO are used to:**
(A) Accelerate the electronic beam
(B) Disperse the electronic beam
(C) Focus the electronic beam
(D) Both (A) and (B)
(E) **Both (A) and (C)✓**

79. **The grid G in CRO is at:**
(A) Negative potential w.r.t. cathode
(B) Positive potential w.r.t. anode
(C) Negative potential w.r.t. anode
(D) **Both (A) and (C)✓**
(E) Both (B) and (C)

80. **In a CRO, there are:**
(A) Two sets of deflecting plates
(B) Three sets of deflecting plates
(C) Four deflecting plates
(D) **Both (A) and (C)✓**
(E) None is correct

81. **Voltage applied across the x plates deflects the beam:**
(A) Vertically on the screen
(B) **Horizontally on the screen✓**
(C) At an angle 60° to the horizontal
(D) At an angle 30° to the vertical
(E) Both (C) and (D)

82. **A voltage applied across the x plates is:**
(A) Provided by a circuit that is built in CRO
(B) Called sweep generator
(C) **Called time base generator✓**
(D) All are true
(E) None is true

83. **A voltage applied across the y plates deflects the beam:**
(A) At an angle 30° to the horizontal
(B) At an angle 60° to the vertical
(C) Both (A) and (B)
(D) Horizontally on the screen
(E) **Vertically on the screen✓**

84. **The output waveform of time base generator is:**
(A) **Sinusoidal✓**
(B) Elliptical
(C) Saw-toothed
(D) Circular

(E) Square

85. **Saw-tooth waveform means that the voltage:**
(A) **Increases linearly with time and then drops to zero✓**
(B) Decreases linearly with time
(C) Increases non-linearly with time
(D) Never drops to zero
(E) None of these

86. **Sinusoidal voltage to be measured is applied to the:**
(A) x plates of CRO
(B) **y plates of CRO✓**
(C) z plates of CRO
(D) Both (A) and (C)
(E) None of these

87. **Synchronization controls of CRO are used to synchronize the:**
(A) Voltages
(B) Frequencies
(C) Periods
(D) **Both (B) and (C)✓**
(E) Currents

88. **By means of waveform displayed on the screen of CRO, we can measure:**
(A) Voltage
(B) Frequency of voltage
(C) Phase of voltage
(D) Both (B) and (C)
(E) **All of these✓**

89. **On the screen of CRO, y-axis is calibrated in:**
(A) Time and x-axis in volts
(B) **Volts and x-axis in time✓**
(C) In time and x-axis in amperes.
(D) In frequency and x-axis in time
(E) None of these

90. **By CRO we can determine:**
(A) Instantaneous voltage
(B) Peak voltage
(C) Peak current
(D) **Both (A) and (B)✓**
(E) None of these

91. **Time period of sinusoidal voltage applied to CRO can be measured by using time calibration of:**
(A) **X-axis✓**
(B) Y-axis
(C) Z-axis
(D) Any of these
(E) All of these

92. **The phase difference between two voltages can be obtained by displaying their waveforms:**
(A) **Simultaneously✓**
(B) Instantaneously
(C) Turn by turn
(D) Either (A) or (B)
(E) None of these

TORQUES, GALVANOMETERS

93. **A galvanometer usually consists of a:**
(A) Coil placed in an electric field
(B) Wire placed in a magnetic field
(C) **Coil placed in a magnetic field✓**
(D) Coil and a scale only
(E) Both (A) and (C)

94. **If current is flowing upward in a wire (placed parallel to a wall) placed in a magnetic field (west to east), then it will experience a force directed:**
(A) East
(B) **North✓**

(C) South (D) West
(E) None of these

95. Suppose that the axis of rotation of a current carrying rectangular coil is perpendicular to the magnetic field. The angle α in $\tau = IBA \cos \alpha$ is the angle made by the coil with:
(A) Vector area of coil (B) Plane of the coil
(C) Axis of the coil
(D) The part of the coil which is perpendicular to the axis
(E) Both (B) and (D)✓

96. The coil of a galvanometer is suspended between poles of a U-shaped magnet which are:
(A) Plane-shaped (B) Convex shaped
(C) Concave shaped✓ (D) Any of these
(E) None of these

97. The rectangular coil of the galvanometer is made of:
(A) Copper wire (B) Enameled copper wire✓
(C) Enameled steel wire (D) Steel wire
(E) None of these

98. A galvanometer can be made more sensitive if $\frac{c}{BAN}$ is made:
(A) Small✓ (B) Large
(C) Very large (D) Any of these
(E) None of these

99. A current carrying rectangular coil of length L (parallel to its axis) and breadth 'a' placed in a magnetic field rotates due to couple of forces. When the field makes an angle α with the plane of coil, then moment arm of the couple is:
(A) Length of the coil (B) Breadth of the coil
(C) $a \tan \alpha$✓ (D) $a \sin \alpha$
(E) $a \cos \alpha$

100. In the formula $\tau = NIBA \cos \alpha$, the symbol N denotes:
(A) Number of turns per unit volume of the coil
(B) Total number of turns✓
(C) Number of electrons passing through the coil
(D) Number of charges passing through the coil
(E) None of these

101. To make the field stronger near the coil of galvanometer, we place inside the coil a:
(A) Hard aluminium cylinder
(B) Soft copper cylinder
(C) Soft iron cylinder✓
(D) Cylinder made of tungsten
(E) Either (A) or (D)

102. A torque acting on a current carrying coil placed in a magnetic field is given by:
(A) $\tau = IBA \cos \alpha$ (B) $\tau = IBA \sin \alpha$
(C) $\tau = IBA \cos \alpha$ (D) Both (A) and (C)✓
(E) Both (A) and (B)

103. A moving coil galvanometer is based on the following effect of current:
(A) Chemical (B) Magnetic✓
(C) Heating (D) Touching
(E) None of these

104. Concave pole pieces and soft iron cylinder used in the construction of a galvanometer make the:
(A) Electric field radial

(B) Magnetic field stronger
(C) Magnetic field radial
(D) Both (B) and (C)✓
(E) None of these

105. While constructing a galvanometer, the enameled copper wire is wound on:
(A) Non magnetic material✓ (B) Magnetic material
(C) A conductor (D) An insulator
(E) None of these

106. Radial magnetic field is used in a galvanometer so that galvanometer scale is:
(A) Logarithmic (B) Linear✓
(C) Exponential (D) Both (A) and (C)
(E) None of these

107. Torsion couple in the galvanometer:
(A) Is also called restoring couple
(B) Restores the coil to original position
(C) Is proportional to angle of deflection θ
(D) Is calculated by cθ
(E) All of these✓

108. When the coil of the galvanometer comes to rest, then the deflecting torque is:
(A) Equal to restoring couple✓
(B) Greater than restoring couple
(C) Smaller than the restoring couple
(D) Any of these
(E) None of these

109. NIBA = cθ gives:

(A) $I = \frac{c}{BAN}\theta$

(B) $\theta = \frac{c}{NIBA}$

(C) $\theta = \frac{NIBA}{c}$

(D) Both (A) and (C)✓
(E) Both (B) and (C)

110. Current passing through the coil of the galvanometer is proportional:
(A) Directly to the angle of deflection
(B) Inversely to the magnetic field of magnet
(C) Inversely to the area of the coil
(D) Directly to the restoring couple per unit twist
(E) All of these✓

111. A moving coil galvanometer is based on the:
(A) Magnetic effect of current✓
(B) Heating effect of current
(C) Chemical effect of current
(D) Both (A) and (C)
(E) None of these

112. In lamp and scale arrangement for measuring the angle of deflection, the scale is:
(A) Mass scale (B) Opaque scale
(C) Transparent (D) Translucent✓
(E) None of these

113. Scale is kept away from the mirror of the galvanometer at a distance of:

(A) One metre✓ (B) Two metres
(C) 0.5 metre (D) 0.6 metre
(E) None of these

114. **The displacement of the spot of light on the scale is proportional to the angle of deflection provided the angle of deflection is:**
(A) Small✓ (B) Large
(C) Much larger (D) Any of these
(E) None of these

115. **In a pivoted type galvanometer, the coil is pivoted between two:**
(A) Jewels (B) Bearings
(C) Jewelled bearings✓ (D) All are correct
(E) None is correct

116. **In pivoted type galvanometer, a light pointer used to read the angle of deflection of the coil is made of:**
(A) Steel (B) Tungsten
(C) Copper (D) Aluminium✓
(E) None of these

117. **A sensitive galvanometer gives:**
(A) Large deflection for a given current✓
(B) Small deflection for a given current
(C) Very small deflection for a given current
(D) Both (B) and (C)
(E) None of these

118. **To increase sensitivity of a galvanometer:**
(A) c may be decreased (B) B may be increased
(C) Area A may be decreased (D) Both (A) and (B)✓
(E) Both (A) and (C)

119. **Couple necessary to produce unit twist is called:**
(A) Restoring couple (B) Deflecting couple
(C) Reaction couple (D) Torsion couple✓
(E) None of these

120. **In a stable galvanometer, the coil comes to rest:**
(A) Quickly✓
(B) After oscillating several times
(C) After oscillating 100 times
(D) Both (A) and (B)
(E) Both (B) and (C)

121. **Dead beat galvanometer is so called because its coil comes to rest:**
(A) After oscillating several times
(B) Quickly✓
(C) After oscillating one hundred times
(D) Both (A) and (C)
(E) None of these

122. **Dead beat galvanometer is so called because it is:**
(A) Unstable (B) Always dead
(C) Stable✓ (D) Both (B) and (C)
(E) None of these

AVO METER AND DMM

123. A properly shunted galvanometer acts as:
(A) An ammeter✓
(B) A voltmeter
(C) An ohmmeter
(D) Any of these
(E) None of these

124. An ammeter:
(A) Measures the current in microamperes
(B) Is an abbreviation of ampere-meter
(C) Is basically a galvanometer
(D) All are true
(E) (B) and (C) only✓

125. Most meter movements give full scale deflection with a current of:
(A) A few mA only✓
(B) A few μA only
(C) A few amperes only
(D) All are true
(E) None of these

126. To convert a galvanometer into an ammeter, we connect with it a:
(A) Low value by pass resistor
(B) Shunt
(C) Low value parallel resistor
(D) Any of above✓
(E) High value series resistance

127. A thick piece of copper wire:
(A) Has very large resistance
(B) Has small resistance
(C) Can be used as a shunt
(D) Both (B) and (C)✓
(E) Both (A) and (C)

128. To convert a galvanometer into a voltmeter, we connect with it a:
(A) A high value series resistance✓
(B) Shunt
(C) Low value by pass resistance
(D) Parallel resistance
(E) All except A

129. The resistance of the shunt is:
(A) Very small✓
(B) Very large
(C) Large
(D) Either (A) or (C)
(E) None of these

130. The resistance of ammeter is:
(A) Very small✓
(B) Very large
(C) Large
(D) Either (A) or (C)
(E) None of these

131. After modifying a galvanometer, we can make:
(A) An ammeter
(B) A voltmeter
(C) An ohmmeter
(D) Any of these✓
(E) None of these

132. An ammeter is connected:
(A) Always in series with the circuit✓
(B) Always in parallel with the circuit
(C) Sometimes in series, sometimes in parallel
(D) Any of above
(E) None of these

133. **A voltmeter:**
   (A) Is a galvanometer with high resistance in series
   (B) Must be connected in parallel with the circuit
   (C) Is galvanometer with low by pass resistance
   (D) **Both (A) and (B)✓**
   (E) Both (B) and (C)

134. **A voltmeter is connected:**
   (A) Always in series with the circuit
   (B) **Always in parallel with the circuit✓**
   (C) Sometimes in series and sometimes in parallel
   (D) Any of above
   (E) None of these

135. **The resistance to be used to convert a galvanometer into a voltmeter, the formula used in:**
   (A) $R_h = \frac{I_g R_g}{I - I_g}$ (B) $R_s = \frac{I_g R_g}{I - I_g}$
   (C) $R_h = \frac{V}{Ig} - R_g$ ✓ (D) $R_s = \frac{V - I_g R_g}{I_g}$
   (E) Both (A) and (C)

136. **A proper combination of a galvanometer and a series resistance acts as:**
   (A) An ammeter (B) **A voltmeter✓**
   (C) An ohmmeter (D) Any of these
   (E) None of these

137. **The resistance to be used to convert a galvanometer into an ammeter, the formula used is:**
   (A) $R_s = \frac{I_g R_g}{I - I_g}$ ✓ (B) $R_h = \frac{V - I_g R_g}{I_g}$
   (C) $R_h = \frac{V}{I_g} - R_g$ (D) $R_s = \frac{V}{Ig} - R_g$
   (E) Both (B) and (C)

138. **A proper combination of a galvanometer and shunt acts as:**
   (A) An ohmmeter (B) A voltmeter
   (C) **An ammeter✓** (D) Any of these
   (E) None of these

139. **A galvanometer, an adjustable resistance and a cell connected in parallel with galvanometer act as:**
   (A) An ohmmeter (B) An ammeter
   (C) A potentiometer (D) A voltmeter
   (E) **None of these✓**

140. **The zero of the scale of an ohmmeter is marked at its:**
   (A) Extreme left end (B) **Extreme right end✓**
   (C) Centre (D) Any of these
   (E) None of these

141. **A proper combination of a galvanometer, an adjustable resistance and a cell connected in series acts as:**
   (A) **An ohmmeter✓** (B) An ammeter
   (C) A voltmeter (D) Any of these
   (E) None of these

142. **When the terminals c and d of an ohmmeter are not connected with each other the pointer rests on the scale at the:**
   (A) Extreme right (B) **Extreme left✓**
   (C) Zero ohm (D) 100 ohms

(E) Both (B) & (C)

143. When the terminals c and d of an ohmmeter are connected with each other, the pointer rests on the scale at the:
(A) Extreme right
(B) Zero ohm
(C) Extreme left
(D) Infinity
(E) Both (A) and (B)✓

144. When the ohmmeter measures the infinite resistance, its pointer lies at:
(A) Left end of the scale✓
(B) Centre of the scale
(C) Right end of the scale
(D) Right quarter portion of the scale
(E) None of these

145. An avometer can measure:
(A) Current in amperes
(B) Potential difference in volts
(C) Resistance in ohms
(D) Any of these✓
(E) All of these simultaneously

146. An avometer can be used to act as ammeter, voltmeter or ohmmeter with the help of:
(A) Function selector switch✓
(B) Range selection switch
(C) CRO
(D) Both (A) and (C)
(E) Both (B) and (C)

147. An avometer measures:
(A) D.C voltages only
(B) A.C voltages only
(C) Currents only
(D) Resistances only
(E) All of these✓

148. Multi-range ammeter consists of a number of:
(A) Low resistances connected in parallel with galvanometer✓
(B) Low resistances connected in series with galvanometer
(C) High resistance-connected in series with galvanometer
(D) Both (A) and (C)
(E) None of these

****

Electronics

Select the correct answer and encircle it.

1. **Crystal of germanium or silicon in its pure form at absolute zero acts as:**
   (a) A conductor (b) A semiconductor
   (c) An insulator✓ (d) Both (a) and (c)
2. **A hole in p-type may be due to:**
   (a) Trivalent impurity (b) Breaking of some covalent-bond
   (c) Germanium (d) Either (a) or (b)✓
3. **Depletion region is the region around the p-n junction and:**
   (a) Bs chargeless✓ (b) Contains protons as charge
   (c) Contains electrons as charge carries (d) Contains holes as charge carries
4. **Computer chips are made from:**
   (a) Iron (b) Silicon✓
   (c) Helium (d) Strontium
5. **Silicon is one of the most commonly used:**
   (a) Conductor (b) Dielectric
   (c) Insulator (d) Semiconductor✓
6. **At room temperature, crystal of germanium, its pure form, act as:**
   (a) A conductor (b) A semiconductor✓
   (c) An insulator (d) Both (a) and (b)
7. **An outer most orbit represents stable configuration if it possesses:**
   (a) 4 electrons (b) 8 electrons✓
   (c) 12 electrons (d) 16 electrons
8. **A p-type crystal is:**
   (a) Neutral as a whole✓ (b) Impurity added crystal
   (c) Pure crystal (d) Positively charged
9. **Whenever a covalent bond breaks it creates:**
   (a) An electron (b) A hole
   (c) An electron-hole pair✓ (d) A positron
10. **The impurity in the germanium is usually in the ratio of:**
    (a) $1 : 10^4$ (b) $1 : 10^8$✓
    (c) $1 : 10^{12}$ (d) $1 : 10^{16}$
11. **Majority charge carriers in the p-region of p-n junction are:**
    (a) Electrons (b) Positrons
    (c) Holes✓ (d) Neutrons
12. **When phosphorous is added as an impurity in germanium, there is an increase in:**
    (a) Free electrons in Ge✓ (b) Holes in Ge
    (c) Positrons in Ge (d) Both (a) and (b)
13. **Depletion region contains:**
    (a) Protons (b) Positive ions
    (c) Negative ions (d) Both (b) and (c)✓
14. **Potential barrier across the p-n junction:**
    (a) Starts further diffusion of electrons into p-region (b) Stops further diffusion of electrons into n-region
    (c) Stops further diffusion of electrons into p-region✓ (d) None of these
15. **As a result of diffusion, a region is formed around the p-n junction which is a:**
    (a) Chargeless region (b) Depletion region

(c) Negatively charged region (d) Both (a) and (b)✓

16. A potential difference is developed across the depletion region of p-n junction due to:
(a) Positive ions (b) Negative ions
(c) Both (a) and (b)✓ (d) Excess of electrons

17. All the valence electrons present in a crystal of silicon are bound in their orbits by:
(a) Ironic bond (b) Covalent bond✓
(c) Molecular bond (d) Both (a) and (b)

18. Atomic number of germanium atom and number of valence electrons in it are respectively:
(a) 32, 4✓ (b) 4, 32
(c) 14, 4 (d) 22, 3

19. The huge advances in electronics over the recent past are due to discovery and use of:
(a) Conductors (b) Insulators
(c) Semiconductors✓ (d) Iron

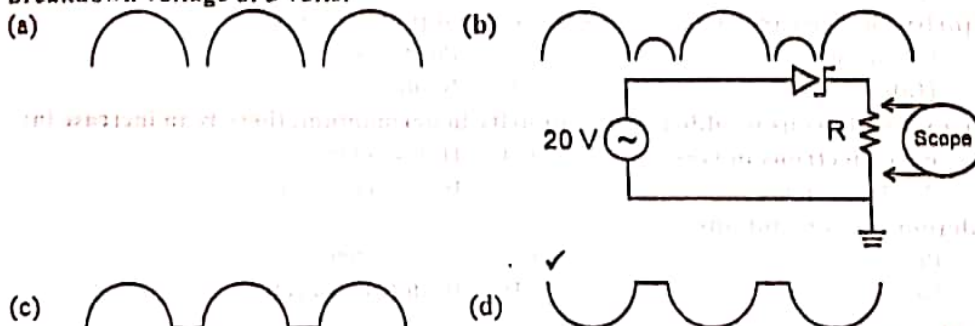
20. It is possible that the Newton ion theory or gravitation may need to be modified at short range. Suppose that the potential energy between two masses m and m' is given by:

$$V(r) = -\frac{Gmm}{r}(1 - ae^{-r/\lambda})$$

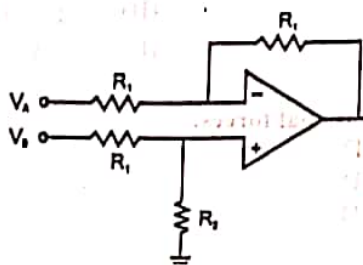
For short distances $r << \lambda$, calculate the force between m and m'.
(a) $F = -Gmm'/r^2$ (b) $F = -Gmm'(1-a)/r^2$✓
(c) $F = -Gmm'a/\lambda r$ (d) $F = -Gmm'(1+a)/r^2$

21. Find the output of the circuit (shown on the following page) using only NAND gates!
(a) A NAND B (b) A XOR B✓
(c) A AND B (d) A NOR B

22. Adding negative feedback to an amplifier results in which of the following?
(a) Decreased gain, decreased distortion, increased input impedance, and decreased output impedance✓
(b) Decreased gain, decreased distortion, decreased input impedance, and increased output impedance
(c) Decreased gain, increased distortion, increased input impedance, and decreased output impedance
(d) Increased gain, increased distortion, increased input impedance, and decreased output impedance

23. What waveform appears on the oscilloscope for the following circuit? The Zener diode has a breakdown voltage of 5 volts:
(a) (b)

(c) (d)✓

24. Which of the following best describes the way in which a look-in amplifier improves signal to noise ratio. The amp operates with a reference frequency w and a time constant RC:
(a) It acts like a narrow band amplifier at frequency w with a band pass of about 1/RC. ✓
(b) It rejects all noise at frequencies < w + 1/RC.
(c) It rejects all noise at frequencies > w + 1/RC.
(d) It amplifies signals at frequency w and rejects noise at frequencies < 1/RC.

25.

What is the output of the OP AMP circuit shown above?

(a) $R_2(V_B - V_A)/R_1$✓ (b) $R_1(V_B - V_A)/R_2$

(c) $R_1(V_A + V_B)/R_2$ (d) $R_2V_A/R_1 - R_1V_B/R_2$

26. **Determine the logic statement for the CMOS gate shown, where Q1 and Q4 are n-channel MOSFET and Q2 and Q3 are p-channel MOSFET. Assume positive logic:**

(a) AND (b) OR

(c) NOR✓ (d) NAND

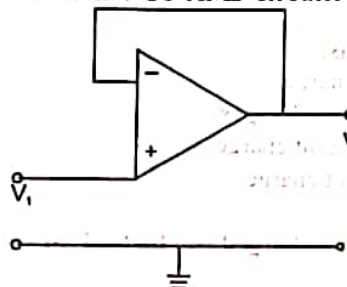
27. **For the below circuit, determine the waveform which appears at point A.**

(a) Sine wave of frequency w = 1/3 (RC)

(b) **Sine wave of frequency $1/\sqrt{6}$ (RC)**✓

(c) Square wave of frequency $1/\sqrt{6}$ (RC)

(d) Triangle wave of frequency of frequency 1/RC

28. **What is the basic function of the below OP AMP circuit?**

(a) **Acts as a high impedance buffer with unity gain.**✓

(b) Act as a low impedance buffer with unity gain.

(c) Acts as a high impedance buffer with gain equal to the open loop gain of the OP AMP.

(d) Acts as a low impedance buffer with gain equal to the open loop gain of the OP AMP.

COULOMB'S LAW, FIELDS & LINES OF ELECTRIC FORCE

29. **If the distance between two charges is doubled, the force between them will become:**

(A) Double (B) Half

(C) Three times (D) **One fourth**✓

(E) One third

30. **The value of ε_0 in Coulomb's law is:**

(A) 9×10^9 Nm^2 C^{-2} (B) **8.85×10^{-12} C^2 N^{-1} m^{-2}**✓

(C) 8.85×10^{-12} Nm^2 C^{-2} (D) 9×10^9 C^2 N^{-1} m^{-2}

(E) None of these

31. **The SI unit of constant k in Coulomb's law is:**

(A) **Nm^2 C^{-2}**✓ (B) C^2 N^{-1} m^{-2}

(C) C^2 N^{-2} m^{-2} (D) Nm^{-2} C^2

(E) None of these

32. **Two charges are located respectively at positions $\vec{r}_1 = 3.0\,\hat{j}$ and $\vec{r}_2 = 4.0\,\hat{i}$ w.r.t. certain reference point. The distance between the charges is:**

(A) Zero
(B) $4\hat{i}+3\hat{j}$
(C) $4\hat{i}-3\hat{j}$✓
(D) $12\hat{k}$
(E) None of these

33. **Origin of the electric and the gravitational forces:**
(A) was known in 1911 A.D.
(B) was known in 1811 A.D.
(C) was known in 1711 A.D.
(D) **Is still unknown✓**
(E) was known in 1611 A.D.

34. **The concept of electric field theory was introduced by:**
(A) **Michael Faraday✓**
(B) Newton
(C) Dalton
(D) Kepler
(E) Einstein

35. **Michael Faraday is known by his work on:**
(A) Nuclear strong force
(B) Gravitational force
(C) Nuclear weak force
(D) **Electric force✓**
(E) None of these

36. **There are two charges of 1μC and 5μC placed at certain distance. The ratio of the forces acting on each other will be:**
(A) 1 : 5
(B) **1 : 1✓**
(C) 5 : 1
(D) 1 : 25
(E) None of these

37. **Electric field strength is defined as:**
(A) Work done on unit charge
(B) **Force exerted on unit charge✓**
(C) Distance covered by unit charge
(D) Power exerted by unit charge
(E) None of these

38. **Electric intensity at a place due to a charged conductor is a:**
(A) Scalar quantity
(B) **Vector quantity✓**
(C) Semi-vector and semi-scalar
(D) Dimensionless quantity
(E) Both (A) and (D) are true

39. **The intensity at a point due to a charge is inversely proportional to:**
(A) Amount of charge
(B) Size of the charge
(C) Distance between charge and the point
(D) **Square of the distance from the charge✓**
(E) None of these

40. **The SI unit of charge is:**
(A) **Ampere✓**
(B) Watt
(C) Coulomb
(D) Volt
(E) Joule

41. **The electric field lines start from:**
(A) **Positive charge✓**
(B) Negative charge
(C) Either (A) or (B)
(D) Neutron
(E) An atom

42. **Electric lines of force:**
(A) Intersect each other
(B) Are always parallel
(C) Are always anti-parallel
(D) **Never intersect✓**

(E) None of these

43. If a field force of 1N acts on a test charge of 1 μC, then the strength of electric field at that point is:
(A) 1 N/C
(B) 1 N/μC
(C) 10^7 N/C✓
(D) 10^6 N/C
(E) Both (A) and (D)

44. A charge q_o placed at certain point P within an electric field due to charge q experiences an electric field intensity equal to:
(A) $\frac{F}{q_o}$ ✓
(B) $\frac{F}{q}$
(C) $\frac{kq}{r^2}$
(D) Both (A) and (B)
(E) Both (A) and (C)

45. By placing a dielectric in between the charges, the electrostatic force between them:
(A) Is always reduced✓
(B) Is always increased
(C) Is not affected
(D) Is increased one million times
(E) None of these

46. The value of relative permittivity of different dielectrics are:
(A) Equal
(B) Different
(C) Greater than one
(D) Smaller than one
(E) Both (B) and (C)✓

47. Electric field lines emerge from the charges in:
(A) One dimension
(B) Two dimensions
(C) Three dimensions✓
(D) Four dimensions
(E) None of these

48. Field lines are closer to each other in the region where the field is:
(A) Stronger✓
(B) Weaker
(C) Much weaker
(D) Absent
(E) None of these

49. In case of two identical charges placed certain distance apart, the electric field lines are:
(A) Straight lines
(B) Sine curves
(C) Curved✓
(D) Both (A) and (B)
(E) None of these

PHOTOCOPIER AND INKJET PRINTER

50. Electrostatics is the branch of physics which deals with the study of electric charges:
(A) At rest
(B) At rest under the action of electric forces✓
(C) In motion under the action of electric forces
(D) In motion
(E) At rest under the action of nuclear forces

51. Static electricity is produced by the transfer of:
(A) Electrons✓
(B) Protons
(C) One fluid
(D) Two fluids
(E) None of these

52. The photocopying process is called:
(A) Geography
(B) Sonography
(C) Xerography✓
(D) Zerography

(E) None of these

53. Xerography means:
(A) Dry writing✓
(B) Wet writing
(C) Poor writing
(D) Excellent writing
(E) Both (A) and (C)

54. An example of a photoconductor is:
(A) Boron
(B) Carbon
(C) Iron
(D) Aluminium
(E) Selenium✓

55. An important part of a photocopier is:
(A) Toner cartridge✓
(B) Deflection plates
(C) Charging electrode
(D) Print head
(E) None of these

56. Selenium is:
(A) An insulator
(B) A conductor
(C) Insulator in the dark and becomes conductor when exposed to light✓
(D) Conductor in the dark only
(E) None of these

57. Aluminium is a:
(A) Good insulator
(B) Bad conductor
(C) Both (A) and (B)
(D) Excellent conductor✓
(E) Semiconductor

58. The inkjet printer ejects a thin stream of:
(A) Water
(B) Oil
(C) Ink✓
(D) Any of above
(E) None of these

59. An important part of an inkjet printer is:
(A) Toner
(B) Drum
(C) Deflection plates✓
(D) Heated rollers
(E) None of these

60. An inkjet printer uses in its operation:
(A) Neutrons only
(B) Mesons only✓
(C) Positrons and photons
(D) An electric charge
(E) None of these

ELECTRIC FLUX, GAUSS'S LAW

61. Electric flux is:
(A) Cross product of two vectors
(B) Dot product of two vectors
(C) A vector quantity
(D) A scalar quantity
(E) Both (B) and (D)✓

62. The number of field lines passing through a certain element of area is known as:
(A) Electric intensity
(B) Electric flux✓
(C) Lines of force
(D) Charge in that element
(E) Both (A) and (B)

63. In the formula $\phi_e = EA \cos \theta$, the angle θ is the angle between field lines and:
(A) Area✓
(B) x-axis
(C) The normal to the area
(D) y-axis
(E) Both (B) and (C)

64. The number of field lines passing through unit area held perpendicular to the field lines

represent:
(A) Flux in that region (B) Intensity of the field✓
(C) Charge (D) Area of the region
(E) None of these

65. The SI unit of electric flux is:
(A) N^2mC^{-1} (B) Nm^2C^{-1}✓
(C) Nm^2C (D) NmC^{-2}
(E) NmC^{-1}

66. When certain area A is held parallel to the field lines, then:
(A) No lines cross this area✓
(B) Maximum lines pass through this area
(C) The number of lines are between zero and maximum
(D) Both (A) and (B) are correct
(E) None of these

67. The electric flux through any surface depends upon:
(A) Intensity of electric field
(B) Area of the surface
(C) Angle between intensity and area
(D) All of these✓
(E) None of these

68. Certain charge +q is placed at the centre of a sphere. At each patch of the sphere, the directions of electric intensity and vector area are:
(A) Same✓ (B) Different
(C) Opposite to each other (D) At 60° with each other
(E) Both (B) and (C)

69. Total spherical surface area is given by the formula:
(A) $\frac{4}{3}\pi r^2$ (B) $4\pi r^3$
(C) $4\pi r^2$✓ (D) $\frac{4}{3}\pi r$
(E) None of these

70. To find ϕ_e by the formula $\phi_e = \vec{E}.\vec{A}$, the surface area should be:
(A) Curved (B) Flat✓
(C) Either (A) or (B) (D) Both (A) and (B)
(E) None of these

71. Flux through a closed surface of any shape and flux through the surface of a sphere drawn around a charge are:
(A) Different (B) Same✓
(C) Such that it is greater in the first case
(D) Such that it is greater in the second case
(E) None of these

72. Total flux through a closed surface depends upon:
(A) Shape or geometry of the closed surface
(B) Charge enclosed
(C) Nature of the medium
(D) Both (A) and (B)
(E) Both (B) and (C)✓

73. The interior of a hollow charged metal sphere is a region which:
(A) Contains some magnitude of electric field
(B) Is full of electric field lines

(C) Is field-free region✓
(D) Either (A) or (B)
(E) None of these

74. **Electric intensity due to an infinite sheet of charge is given by the formula:**
(A) $\vec{E} = \frac{\sigma}{\varepsilon_0}\hat{r}$
(B) $E = \frac{\sigma}{2\varepsilon_0}$
(C) $E = \frac{\sigma}{2\varepsilon_0}\hat{r}$
(D) $\vec{E} = \frac{\sigma}{2\varepsilon_0}\hat{r}$
(E) Both (B) and (D)✓

75. **While finding the electric intensity at a point between two oppositely charged parallel plates, the Gaussian surface is taken in the form of a hollow:**
(A) Cylinder
(B) Box✓
(C) Sphere
(D) Circle
(E) Rectangle

76. **Gaussian surface is always:**
(A) Rectangular
(B) Spherical
(C) Cylindrical
(D) Box shape
(E) Any of these✓

77. **The flux is SI unit passing through any closed surface enclosing a charge of 8.85×10^{-12} Coulombs is:**
(A) 1✓
(B) 0.1
(C) 10^5
(D) 8.85×10^{-12}
(E) 8.85×10^{12}

78. **The surface density of charge is defined as:**
(A) Charge per volume
(B) Mass per volume
(C) Charge per area✓
(D) Mass per area
(E) Both (C) and (D)

79. **Electric intensity between two oppositely charged parallel plates is given by the formula:**
(A) $\vec{E} = \frac{\sigma}{\varepsilon_0}\hat{r}$
(B) $E = \frac{\sigma}{\varepsilon_0}$
(C) $\vec{E} = \frac{\sigma}{2\varepsilon_0}\hat{r}$
(D) $E = \frac{\sigma}{2\varepsilon_0}$
(E) Both (A) and (B) ✓

80. **If σ is the density of charge spread over area A of the Gaussian surface, then the charge enclosed by it is:**
(A) σA✓
(B) $\frac{A}{\sigma}$
(C) $\frac{\sigma}{A}$
(D) $\sigma + A$
(E) $\sigma - A$

81. **In the formula $\vec{E} = \frac{\sigma}{\varepsilon_0}\hat{r}$, the unit vector $\hat{r}$:**
(A) Is directed from positive plate to negative plate
(B) Is directed from negative to positive plate
(C) Shows the direction of intensity
(D) Both (A) and (C) are correct✓
(E) Both (B) and (C) are correct

82. **Flux through a closed surface is equal to the charge enclosed by it multiplied by:**

(A) ε_0 (B) $\frac{1}{\varepsilon_0}$✓
(C) Area enclosed (D) The number of field liens
(E) None of these

ELECTRIC POTENTIAL AND ELECTRICAL ENERGY

83. Tick the correct statement:
(A) **Both the potential and potential difference are scalars**✓
(B) Potential is a scalar but potential difference is a vector.
(C) Both are vectors
(D) Potential is vector but potential difference is scalar
(E) None of these is correct

84. Two opposite charges, each of magnitude 10^{-9} μC are separated by a distance 9 m. The electric potential at a point mid way between them is:
(A) 2V (B) 0✓
(C) 9×10^{-9} V (D) 9×10^{9} V
(E) 0.2V

85. Another name for electric potential energy per unit charge is given by:
(A) Electric intensity (B) Potential gradient
(C) Electric flux (D) **Potential difference**✓
(E) None of these

86. The Earth's potential and potential at infinity are taken:
(A) **Equal**✓ (B) Zero
(C) First is greater than the second
(D) Second is greater than the first
(E) Both (A) and (B)

87. An eV is unit of:
(A) Potential (B) Energy
(C) Work (D) Power
(E) **Both (B) and (C)**✓

88. One electron volt is equal to:
(A) 1.67×10^{-27} Coulomb (B) 9.1×10^{-31} Coulomb
(C) 1.6×10^{-19} Coulomb (D) 3×10^{8} joules
(E) **1.6×10^{-19} joules**✓

89. A particle carrying a charge of 2e falls through a potential difference of 3V. The energy acquired by it is:
(A) 6.0 eV (B) 9.6×10^{-19} J
(C) 1.5 eV (D) 0.66 eV
(E) **Both (A) and (B) are correct**✓

90. The change of potential w.r.t. displacement is called:
(A) Intensity (B) Potential
(C) Potential gradient (D) Both (B) and (C)
(E) **Both (A) and (C)**✓

91. One volt is defined by one:
(A) Coulomb per joule (B) Coulomb per metre
(C) Metre per Coulomb (D) **Joule per Coulomb**✓
(E) None of these

92. The potential at a point situated at a distance of 9 m from a charge of 10^{-6} Coulombs is:
(A) 1 mV (B) 1 μV
(C) 1 nV (D) 1V

(E) 1 kV✓

ELECTRICAL AND GRAVITATIONAL FORCES, MILLIKAN'S METHOD

93. Which of the following forces are conservative?
(A) Frictional force (B) Gravitational force
(C) Electric force (D) Both (B) and (C)✓
(E) Both (A) and (B)

94. Which of the following forces is the weakest?
(A) Nuclear strong force (B) Nuclear weak force
(C) Gravitational force✓ (D) Electrostatic force
(E) None of these

95. Which of the following forces is only repulsive?
(A) Gravitational force (B) Electrostatic force
(C) Nuclear strong force (D) Both (A) and (B)
(E) None of these✓

96. Which of the following forces is only attractive?
(A) Nuclear weak force (B) Electrostatic force
(C) Gravitational force✓ (D) Magnetic force
(E) None of these

97. Which of the following forces follow inverse square law?
(A) Coulomb force (B) Gravitational force
(C) Nuclear strong force (D) Both (B) and (C)
(E) Both (A) and (B)✓

98. The apparatus of Millikan's experiment also contains:
(A) An atomizer (B) Oil droplets
(C) Lens (D) Microscope
(E) All of these✓

99. If a droplet between two oppositely charged horizontal parallel plates is suspended, then:
(A) $F_g = F_e$✓ (B) $F_g > F_e$
(C) $F_e > F_g$ (D) Either (A) or (B)
(E) Both (B) and (C)

100. The oil droplet experiment was demonstrated to find:
(A) Charge on an atom (B) Energy of an atom
(C) Potential difference across two points
(D) Charge on an electron✓
(E) None of these

101. In SI units, the ratio of constant G (in Newton's Law) and k(in Coulomb's law) has the numerical value of:
(A) 1.4×10^{-2} (B) 1.3×10^{2}
(C) 1.3×10^{20} (D) 7.4×10^{-21}✓
(E) None of these

CAPACITOR AND THE ENERGY STORED

102. The ability of a capacitor to store the charge is called:
(A) Resistance (B) Capacitance✓
(C) Reactance (D) Impedance
(E) Both (B) and (C) ✓

103. Capacitor is a device to store:
(A) Charge (B) Energy
(C) Pressure (D) Force
(E) Both (A) and (B)✓

104. The symbol ε_r denotes:
(A) Relative permittivity
(B) Dielectric constant
(C) Relative permittivity
(D) Both (A) and (B)
(E) Both (B) and (C)✓

105. In a charged capacitor, the energy is stored in the:
(A) Positive charge
(B) Negative charge
(C) Electric field between the plates✓
(D) Area of each plate
(E) Both (A) and (B)

106. Energy density is defined as the energy per unit:
(A) Length
(B) Area
(C) Volume✓
(D) Charge
(E) None of these

107. The energy stored in the capacitor is in the form of:
(A) Gravitational P.E.
(B) Electric P.E.✓
(C) Kinetic energy
(D) Solar energy
(E) Both (B) and (D)

108. Relative permittivity of air is:
(A) 1.006
(B) 1.0006✓
(C) 22
(D) 78.5
(E) 2

109. One micro-Coulomb per mega volt is called:
(A) 1 MJ
(B) 1 ohm
(C) 1 pF✓
(D) 1 μJ
(E) 1 kΩ

110. The unit of capacitance is:
(A) Faraday
(B) Ampere
(C) Ohm
(D) Farad✓
(E) Coulomb

111. In order to get the maximum increase in the capacitance of a capacitor with air as medium between the plates, one should fill the gap with:
(A) Mica sheet
(B) Bakelite sheet
(C) Ammonia
(D) Distilled water✓
(E) Any of these

112. Farad is a unit of:
(A) Capacitance✓
(B) Conductivity
(C) Resistivity
(D) Charge
(E) Both (B) and (D)

113. The capacitance of a parallel plate capacitor is C. When the separation between the plates is halved, then its capacitance becomes:
(A) 4C
(B) 2C✓
(C) $\frac{C}{2}$
(D) $\frac{C}{4}$
(E) None of these

114. A dielectric is introduced between the plates of a capacitor kept at constant potential difference. Then the charge on the capacitor will:
(A) Decrease✓
(B) Increase
(C) Remain the same
(D) Either (A) or (B)
(E) None of these

115. Energy stored in a capacitor can be calculated by:

(A) $\frac{1}{2}qV$
(B) $\frac{1}{2}CV^2$
(C) $0.5\,\varepsilon_r\varepsilon_o E^2 Ad$
(D) $0.5\,\varepsilon_r\varepsilon_o E^2$
(E) First three are correct✓

116. In case of a parallel plate capacitor, $\frac{1}{2}\varepsilon_r\varepsilon_o E^2$ gives:
(A) Energy stored in a capacitor
(B) Energy per unit volume of the gap
(C) Energy density
(D) Energy per unit area
(E) Both (B) and (C)✓

117. The formula for energy density is valid only:
(A) At points of low field strength
(B) At points of high field strength
(C) At points of intermediate field strength
(D) At all the points mentioned above✓
(E) Only (A) and (C)

118. Energy stored in a unit volume of the dielectric is proportional to the:
(A) Electric intensity
(B) Square root of electric intensity
(C) Square root of electric charge
(D) Square of electric intensity✓
(E) None of these

119. Coulomb per volt is also called:
(A) Joule
(B) Ohm
(C) Farad✓
(D) Kohm
(E) MJ

120. Capacitance of a capacitor depends upon:
(A) Area of its plates
(B) Separation between them
(C) Medium between them
(D) All of above✓
(E) None of these

DIELECTRICS AND THEIR POLARIZATION

121. The dielectric consists of atoms and molecules which are:
(A) Positively charged
(B) Negatively charged
(C) Neutral on the average✓
(D) Both (A) and (B)
(E) Both (B) and (C)

122. The dielectric is also called:
(A) Semiconductor
(B) Conductor
(C) Insulator✓
(D) Either (A) or (C)
(E) Either (B) or (C)

123. When a dielectric is placed between the plates of a capacitor and is subjected to an electric field, its negative charges:
(A) Are attracted towards negative plate
(B) Are attracted towards positive plate✓
(C) Fly out of the capacitor
(D) Remain intact at their place
(E) None of above

124. A dipole means the two charges:
- (A) Equal in magnitude and opposite in nature✓
- (B) Unequal in magnitude and similar in nature
- (C) Equal in magnitude and similar in nature
- (D) Unequal in magnitude and opposite in nature
- (E) Either (A) or (B)

125. Due to polarization of the dielectric between the plates of a charged capacitor, the electric intensity between the plates:
- (A) Increases
- (B) Decreases✓
- (C) Remains unaffected
- (D) Either (A) or (B)
- (E) None of these

TIME CONSTANT

126. When a charged capacitor is being discharged, the positive charge moves from:
- (A) Its positive to negative plate✓
- (B) Battery to capacitor
- (C) Its negative plate to positive plate
- (D) Capacitor to battery
- (E) None of these

127. The voltage across the capacitor at any instant can be obtained by:
- (A) Dividing C by q
- (B) Multiplying q with C
- (C) Dividing q by C✓
- (D) Adding q into C
- (E) Subtracting C from q

128. Unit of time constant is product of:
- (A) Coulomb and ohm
- (B) Coulomb and watt
- (C) Farad and watt
- (D) Farad and ohm✓
- (E) Both (A) and (B)

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Mathematical Methods of Physics

Select the Correct Answer and encircle it.

INTRODUCTION TO PHYSICS

1. The study of physics involves:
   (A) Structure of space and time
   (B) Interaction of electromagnetic radiation with matter
   (C) Both of them✓
   (D) Chemical changes
   (E) None of them
2. Physics deals with the study of:
   (A) Matter
   (B) Energy
   (C) Both of them✓
   (D) human body
3. The information from far side of the universe are gathered by:
   (A) Radio telescope✓
   (B) Microscope
   (C) Telescope
   (D) spectro scpe
4. Astrophysics is a branch of physics, which deals with:
   (A) Sub-atomic particles
   (B) Stars and galaxies✓
   (C) Light and sound
   (D) music
5. The mechanics, which deals with the objects moving with velocities approaching that of light is called:
   (A) Relativistic mechanics✓
   (B) Wave mechanics
   (C) Quantum mechanics
   (D) Statics
6. Particles have the mass smallest of following is:
   (A) Electron
   (B) Proton
   (C) Neutron
   (D) Quark✓
7. Silicon can be obtained from:
   (A) Lead
   (B) Uranium
   (C) An isotope of oxygen
   (D) Sand✓
8. The branch of physics, which deals with the properties of fundamental particles is called:
   (A) High energy physics✓
   (B) Molecular physics
   (C) Astrophysics
   (D) Space physics
9. Aerodynamics is a branch of:
   (A) Hydrodynamics✓
   (B) Thermodynamics
   (C) Both of them
   (D) statics
10. Radio telescope is used to gather informations from:
    (A) Earth
    (B) Moon only
    (C) Far side of the universe✓
    (D) Sea water
11. The branch of physics, which deals with the study of stars and galaxies is called:
    (A) Solid state physics
    (B) Astrophysics✓
    (C) Molecular physics
    (D) chemical physics
12. Physics is one of the branches of:
    (A) Social sciences
    (B) Physical sciences✓
    (C) Biological sciences
    (D) abstract art
13. ☛ Electron is a particle whose mass is:
    (A) Greater than that of a proton
    (B) Smaller than that of a proton and greater than mass of neutron
    (C) Smaller than that of a proton or a neutron✓
    (D) Greater than that of an atom.
14. The branch of physics, which is mainly concerned with the motion of bodies under the action of forces is called:

(A) Optics (B) Mechanics✓
(C) Thermodynamics (D) Astro physics

15. From sand, we get a material used for construction of computer chips. That material is:
(A) Germanium (B) Silicon✓
(C) Copper (D) Lead

16. In the equation $E = mc^2$, value of c is:
(A) 1,86,008 miles per hour (B) 1,86,000 miles per sec
(C) 3×10^8 m/sec (D) Both A and C
(E) Both B and C✓

17. High energy physics is branch of physics, which deals with:
(A) Stars and galaxies (B) Sub-atomic particles✓
(C) Light and sound (D) Molecules

18. Examples of physical quantities are:
(A) Length✓ (B) Colour
(C) Effect of music (D) All of these

19. Density is defined as:
(A) Mass per volume✓ (B) Volume per mass
(C) Mass × volume (D) Mass per length

20. The branch of physics, which deals with the structure and properties of solids is called:
(A) Plasma physics (B) Solid state physics✓
(C) Any of above (D) Astro physics

21. Relativistic mechanics is a branch of physics, which deals with the bodies moving with velocities:
(A) More than c (B) Approaching c✓
(C) Equal to c (D) Much less than C

UNITS AND SCIENTIFIC NOTATION

22. The System International (SI) is built up from _____ types of units.
(A) One (B) Two
(C) Three✓ (D) Four

23. The number of base units in SI are:
(A) Four (B) Five
(C) Six (D) Seven✓

24. Radian and Steradian are named as _______ units.
(A) Base (B) Derived
(C) Supplementary✓ (D) All of these

25. Pascal is a unit of:
(A) Power (B) Pressure✓
(C) Magnetic field (D) Intensity of light

26. Deca, deci and mega, respectively mean:
(A) $10^1, 10^{-1}, 10^6$✓ (B) $10^6, 10^{-1}, 10^1$
(C) $10^6, 10^1, 10^{-1}$ (D) $10^1, 10^6, 10^{-1}$

27. $1\ (Km)^2$ is equal to:
(A) $10^3\ m^2$ (B) $10^6\ m^2$✓
(C) $10^{10}\ m^2$ (D) $10^{12}\ m^2$

28. 134.7 should be written in scientific notation as:
(A) 134.7 (B) 13.47×10^1
(C) 1.347×10^2✓ (D) 0.1347×10^3

29. Unit of solid angle is called:
(A) Radian (B) Degree
(C) Steradian✓ (D) Angstrom

30. Unit for measuring intensity of light is:
    (A) Candela✓ (B) Steradian
    (C) Mole (D) Decibel
31. J-second can be written in terms of base units as:
    (A) Kg-m^2 sec^{-1}✓ (B) Kg-m^2 sec^{-3}
    (C) Kg-m sec^{-2} (D) Kg^2-m^{-1} sec^2
32. Light year is a unit of:
    (A) Time (B) Distance✓
    (C) Velocity (D) Intensity of light
33. Kg-m^2 sec^{-2} is SI unit of:
    (A) Work✓ (B) Force
    (C) Pressure (D) Momentum
34. Typical examples of base quantities are:
    (A) Length (B) Mass
    (C) Time (D) Only A and C
    (E) All of these✓
35. System International (SI) of units was established in:
    (A) 1960✓ (B) 1970
    (C) 1980 (D) 1990
36. Supplementary unit/s in SI units is/are:
    (A) Radian (B) Steradian
    (C) Degree (D) Only A and B✓
    (E) All of these
37. Unit of pressure is:
    (A) Watt (B) Mole
    (C) Candela (D) Pascal✓
38. Pico, kilo and tera mean:
    (A) 10^{-12}, 10^{-3}, 10^{-18} (B) 10^{18}, 10^{3}, 10^{-12}
    (C) 10^{-12}, 10^{3}, 10^{12}✓ (D) 10^{18}, 10^{-12}, 10^{3}
39. Unit of plane angle is:
    (A) Degree (B) Steradian
    (C) Both A and B (D) Radian✓
40. Unit/s of distance is/are:
    (A) Metre (B) Year
    (C) Light year (D) Both A and C✓
    (E) Both B and C
41. Candela is a unit for measuring:
    (A) Amount of substance (B) Intensity of light✓
    (C) Amount of current (D) Distance
42. 1 m^3 is equal to:
    (A) 10^6 cm^3 (B) 10^9 mm^3
    (C) 10^{-6} cm^3 (D) Both A and B✓
43. Steradian is the angle subtended at the centre of the ________.
    (A) Circle (B) Sphere✓
    (C) Any of these (D) square
44. Mole is a unit for measuring:
    (A) Amount of substance✓ (B) Intensity of light
    (C) Amount of current (D) mass
45. On conversion, Kg-m^2 sec^{-2} becomes:
    (A) Newton (B) Joule✓

(C) Pascal (D) Watt

46. **Time taken by light from Sun to reach Earth is:**
(A) 500 seconds✓ (B) 600 seconds
(C) 400 seconds (D) 700 seconds

47. **The time interval of 6.3×10^7 seconds is equal to:**
(A) 4 days (B) 3 months
(C) 2 years✓ (D) One light year

48. **Steradian is the ______ angle subtended at the centre of the ______ by an area of its surface equal to the ______ of the radius of the sphere.**
(A) Plane, circle, square (B) Solid, sphere, cube
(C) Plane, circle, cube (D) Solid, sphere, square✓

49. **Coulomb is defined as:**
(A) Amp-sec^{-1} (B) Amp-sec✓
(C) Amp^{-1} sec (D) Amp. m

50. **SI unit of power is:**
(A) Watt✓ (B) Joule
(C) Pascal (D) Newton

51. **Numbers can be expressed in scientific notation which employ power of:**
(A) One (B) Ten✓
(C) 100 (D) 1000

52. **0.0023 is expressed in scientific notation as:**
(A) 2.3×10^{-3}✓ (B) 2.3×10^{3}
(C) 0.023×10^{-1} (D) 0.23×10^{-5}

53. **One newton is equal to:**
(A) $\text{Kg m}^{-1} \text{sec}^{-2}$ (B) $\text{Kg m}^{-2} \text{sec}^{-1}$
(C) Kg m sec^{-2}✓ (D) $\text{Kg m}^{2} \text{sec}$

54. **Which of the following is/are base unit/s:**
(A) Square meter (B) Cubic meter
(C) Candela✓ (D) All of them

55. **The ratio of 1 nanometre to one atto-metre is:**
(A) 10^{9}✓ (B) 10^{8}
(C) 10^{-9} (D) 10^{-8}

56. **Which one of the following is not a base unit:**
(A) Ampere (B) Kelvin
(C) Watt✓ (D) Candela

57. **One metre has ______ nanometer and one nanometer has ______ meter.**
(A) $10^{5}, 10^{5}$ (B) $10^{9}, 10^{-9}$✓
(C) $10^{-9}, 10^{9}$ (D) $10^{5}, 10^{-5}$

58. **One kilogram is actually mass of platinum-iridium alloy cylinder kept at International Bureau of Weights and Measures in France. The ratio of platinum and iridium is:**
(A) 90% : 10%✓ (B) 10% : 90%
(C) 50% : 50% (D) 60% : 40%

59. **The unit which is based on one or more base units is called:**
(A) SI unit (B) Derived unit✓
(C) Unit vector (D) Base unit

60. **1 kg/m^3 is equal to:**
(A) $10^{3} \text{ gm-cm}^{-3}$ (B) $10^{-3} \text{ gm-cm}^{-3}$✓
(C) 1 gm-cm^{-3} (D) $10^{6} \text{ gm. cm}^{3}$

61. **SI unit of absolute temperature is:**
(A) Celsius (B) Kelvin✓

(C) Centigrade (D) Both A and C

62. One meter is the distance travelled by light in vacuum during a time of:
(A) 299,792458 seconds
(B) $\frac{1}{299,792458}$ seconds✓
(C) 2.99792458×10^8 seconds
(D) Both A and C

63. The prefix micro represents the _______th part of a quantity.
(A) 10^{12}
(B) 10^6✓
(C) 10^{-6}
(D) 10^{-2}

64. 1 $gm\text{-}cm^{-3}$ is equal to:
(A) 10^3 $kg\text{-}m^{-3}$✓
(B) 10^{-3} $kg\text{-}m^{-3}$
(C) 1 $kg\text{-}m^{-3}$
(D) 10^6 $kg\text{-}m^{-1}$

65. Conversion of 10^{-6} micro-centimeter in meters is:
(A) 10^{-12}
(B) 10^{-14}✓
(C) 10^{-2}
(D) 10^{-10}

66. One second is equal to the duration in which the outer-most electron of the _______ atom makes 91,92,631,770 vibrations.
(A) Kr-86
(B) Cs-133✓
(C) U-235
(D) N – 14

67. The amount of a substance is measured in:
(A) Kilogram
(B) Litre
(C) Mole
(D) Both A and C✓

68. The SI unit of volume is:
(A) Litre
(B) cm^3
(C) m^3✓
(D) Both A and C

69. The alloy cylinder of mass 1 kg placed at International Bureau of Weights and Measures in France has diameter and height, respectively as:
(A) 3.9 m, 3.9 m
(B) 3.9 cm, 3.9 cm✓
(C) 3.9 m, 3.9 cm
(D) None of these

70. The average time the Earth takes to make exactly one rotation about its axis is defined as:
(A) A solar hour
(B) A solar day✓
(C) A light year
(D) A solar month

71. In mean solar day, the number of seconds are:
(A) 24 seconds
(B) 1440 seconds
(C) 86400 seconds✓
(D) 3600 seconds

72. All of the following have been expressed in proper units except:
(A) Energy = kg $m\text{-}sec^{-2}$✓
(B) Pressure = $N\text{-}m^{-2}$
(C) Area = m^2
(D) Density = $kg\text{-}m^{-3}$

73. Which one is the least multiple:
(A) Pico
(B) Femto
(C) Nano
(D) Atto✓

74. According to the scientific notation, the number 0.0002 can be written as:
(A) 2×10^{-3}
(B) 2×10^{-4}✓
(C) 2×10^{-5}
(D) 2×10^{-2}

SIGNIFICANT FIGURES

75. Tick the correct statement:
(A) All digits 1 to 9 are significant.
(B) Zeros to the left of a significant digit but not between two digits, is not significant.
(C) Zero is significant if it lies between two digits.
(D) Only A and C are true

(E) All are true✓

76. 0.0001210 has ________ significant figures.
(A) Four✓ (B) Three
(C) Seven (D) Eight

77. Significant figures in 5432 are:
(A) Two (B) Three
(C) Four✓ (D) Five

78. Significant figures in 0.2020 are:
(A) Two (B) Three
(C) Four✓ (D) Five

79. Significant figures in 1.0×10^{-3} are:
(A) Two✓ (B) Three
(C) Four (D) Five

80. The definite number of significant figures in 5000 is:
(A) Four (B) Three
(C) Two (D) One✓

81. Significant figures in 2.00×10^{-9} are:
(A) Four (B) Three✓
(C) Two (D) One

82. Significant figures in 0.0010 are:
(A) Four (B) Three
(C) Two✓ (D) One

83. Significant figures in 1.0011000 are:
(A) Eight (B) Seven
(C) Six (D) Five

ERRORS AND UNCERTAINTIES

84. If the absolute uncertainty of an instrument is 0.01 cm, then its least count will be:
(A) 0.005 cm (B) 0.01 cm✓
(C) 0.02 cm (D) 0.001 cm

85. The distance x determined by the difference between two separate position measurements are $x_1 = 10.5 \pm 0.1$ cm and $x_2 = 26.8 \pm 0.1$ cm. Then x will be recorded as:
(A) 16.3 cm (B) 16.3 ± 0.1 cm
(C) 16.3 ± 0.2 cm✓ (D) 16.3 ± 0.01cm

86. Absolute uncertainty in a measuring instrument is equal to:
(A) Percentage uncertainty (B) Least count✓
(C) Accuracy (D) Fractional uncertainty

87. In the formula $V = \frac{\pi d^2 l}{4}$, if the percentage uncertainty in diameter is 0.8% and in length is 0.2%, then the total uncertainty in measuring the volume is:
(A) 1.8%✓ (B) 1.0%
(C) 0.6% (D) 4%

88. The error may occur due to:
(A) Negligence (B) Faulty apparatus
(C) Inappropriate method (D) All of these✓

89. Uncertainty is of following type/types:
(A) Absolute (B) Fractional
(C) Percentage (D) All of these✓

90. The following terms have the same meaning:
(A) Precision, least count and absolute uncertainty✓ (B) Precision and percentage uncertainty

(C) Precision, least count, dimension (D) Fractional and percentage uncertainty

91. For addition and subtraction purposes, absolute uncertainties are:
(A) Added✓ (B) Subtracted
(C) Multiplied (D) Divided

92. For multiplication and division purposes, percentage uncertainties are:
(A) Added✓ (B) Subtracted
(C) Multiplied (D) Divided

93. In case of power factor like r^3 in $V = \frac{4}{3}\pi r^3$, percentage uncertainty in radius is _______ the power factor.
(A) Added into (B) Subtracted from
(C) Multiplied by✓ (D) Divided by

94. To find the uncertainty in the time period of a vibrating body, the least count of the timing device is _______ number of vibrations.
(A) Added into (B) Subtracted from
(C) Multiplied by (D) Divided by✓

95. The time of 30 vibrations of a simple pendulum is recorded as 54.6 seconds by a stop-watch whose least count is 0.1 second. The time period in seconds will be quoted as:
(A) 1.82 ± 0.006 (B) 0.54 ± 0.003
(C) 1.82 ± 0.003✓ (D) 0.54 ± 0.006

96. Volume of an object has been calculated as 47.7 cm^3 with 1.2% uncertainty. The result in cm^3 will be recorded as:
(A) 47.7 ± 1.2 (B) 47.7 ± 0.6✓
(C) 47.7 ± 0.3 (D) 47.7 ± 0.1

97. The maximum possible error in the reading of an instrument is ________ its least count.
(A) Half of✓ (B) Quarter of
(C) Equal to (D) Double than

98. Resistance of a wire has been calculated by $R = \frac{V}{I}$ as 6.2 Ω with 8% uncertainty. Then the result in ohms will be recorded as:
(A) 6.2 ± 8 (B) 6.2 ± 4
(C) 6.2 ± 2 (D) 6.2 ± 0.5✓

99. In formula $V = \frac{\pi d^2 l}{4}$, least count of the screw gauge has been told as 0.01 cm. Diameter of certain solid cylinder is measured as 1.22 cm and length as 5.35 cm. Total percentage uncertainty in volume comes out to be:
(A) 0.9% (B) 1.8%✓
(C) 2.7% (D) 3.6%

100. The maximum possible error in the reading for a meter rod with least count 1 mm is:
(A) 0.005 mm (B) 0.05 mm
(C) 0.5 mm✓ (D) 5.0 mm

ROUNDING OFF THE RESULTS

101. The length of a line was measured with a metre scale of least count = 1 mm by four students. The correct reading will be:
(A) 0.5426 m (B) 0.542 m✓
(C) 0.54 m (D) 0.5 m

102. Multiplying 3.233, 2.105 and 1.05, rounded off answer is recorded as follows:
(A) 7.15✓ (B) 714.573×10^{-2}
(C) 7146×10^{-3} (D) 7.146

103. Addition of 2.2 kg, 10.2 grams and 10.01 grams gives the rounded off answer as:
(A) 2.22003 kg (B) 2.22 kg
(C) 2.2 kg✓ (D) 2 kg

104. Addition of 2.189 kg, 0.089 kg, 11.8 kg and 5.32 kg gives the rounded off answer as:
(A) 19.398 (B) 19.400
(C) 19.4✓ (D) 19.3

105. The length and width of a rectangular plate are measured to be 15.3 cm and 12.80 cm, respectively. The area of plate is:
(A) 195.84 (B) 195.8✓
(C) 195 (D) Any of these

DIMENSIONS

106. A dimension stands for the _______ nature of certain physical quantity.
(A) Super (B) Quantitative
(C) Qualitative✓ (D) Both B and C

107. Dimension of mass is written as:
(A) M (B) [M]✓
(C) (M) (D) [m]

108. In order to check the correctness of an equation, we are to show that _______ of the quantities on _______ side/sides of the equation are _______.
(A) Dimension, left, same (B) Dimension, both, same✓
(C) Error, one, different (D) Error, both, different

109. The dimensions MLT^{-2} refer to the physical quantity:
(A) Torque (B) Force✓
(C) Mass (D) Acceleration

110. The dimensions of torque are:
(A) $[LT^{-1}]$ (B) $[ML^2T^1]$
(C) $[ML^2T^{-2}]$✓ (D) $[MLT^{-2}]$

111. Dimensions are the same for:
(A) Work and energy (B) Force and weight
(C) None of these (D) Both A and B are correct✓

112. The dimensions $[M^0L^0T^{-1}]$ refer to a physical quantity:
(A) Velocity (B) Time period
(C) Frequency✓ (D) Force

113. The dimensional formulae for volume and force, respectively are given by:
(A) $[L^3]$, $[MLT^{-2}]$✓ (B) $[L^3]$, $[ML^2T^2]$
(C) $[MLT^{-2}]$, $[L^3]$ (D) $[L^{-3}]$, $[ML^2T^2]$

114. Which quantity has different dimensions:
(A) Work (B) Pressure✓
(C) Energy (D) Torque

115. Dimensional formulae for density and area are:
(A) $[L^2]$, $[ML^{-3}T^0]$ (B) $[MLT^{-2}]$, $[L^2]$
(C) $[ML^{-3}]$, $[M^0L^2T^0]$✓ (D) $[ML^3]$, $[L^2]$

116. Dimensions of G are:
(A) $[ML^{-3}T^2]$ (B) $[M^{-1}L^3T^{-2}]$✓
(C) $[M^2LT^3]$ (D) None of these

117. In the formula $v = f\lambda$, dimensions of $f\lambda$ are:
- (A) $[M^oLT^{-1}]$✓
- (B) $[M^1L^1T^{-1}]$
- (C) $[T^{-1}]$
- (D) [L]

118. Dimensions of $\frac{1}{2}at^2$ in the equation of motion are:
- (A) $[ML^oT^o]$
- (B) $[M^oL^oT]$
- (C) $[M^oLT^o]$✓
- (D) $[\frac{1}{2}M^oL^oT]$

119. $[MLT^{-1}]$ and $[ML^2T^{-3}]$ are the dimensional representations respectively of:
- (A) Work and momentum
- (B) Momentum and power✓
- (C) Torque and power
- (D) Power and momentum

120. Dimensions are same for:
- (A) Wavelength and amplitude
- (B) Inertia and moment of inertia
- (C) Frequency and angular velocity
- (D) Both A and B are correct
- (E) Both A and C are correct✓

121. Which quantity has different dimension?
- (A) Tension✓
- (B) Work
- (C) Energy
- (D) Torque

122. The dimension of modulus of elasticity is:
- (A) Different from that of coefficient of viscosity
- (B) The same as that of pressure
- (C) The same as that of coefficient of viscosity
- (D) Both A and B are correct✓
- (E) Both A and C are correct

123. Which quantity has different dimension?
- (A) Tension
- (B) Force
- (C) Weight
- (D) Modulus of elasticity✓

124. Planck constant has SI unit of J–second. Its dimension will be:
- (A) $[ML^2T^{-2}]$
- (B) $[ML^2T^{-1}]$✓
- (C) $[M^2LT^{-1}]$
- (D) $[ML^{-2}T^{-1}]$

125. Spring constant has dimension:
- (A) $[MT^{-1}]$
- (B) $[MT^{-2}]$✓
- (C) $[MT^{-3}]$
- (D) $[M^{-2}T^o]$

****

Nuclear Physics-I

(1) "All atomic weights are whole number that they might be integral multiples of the atomic weight of hydrogen, and that all elements might be built up of hydrogen." This hypothesis was suggested by:
(a) **Prout✓** (b) J. J. Thomson
(c) Neil Bohr (d) Heisen Berg

(2) The different isotopes of an element have the same number and arrangement of extranuclear electrons, and consequently their spectra have some general structure; they are distinguished from one another by:
(a) Their different atomic masses✓ (b) Their arrangements in the shells
(c) Their stability to atmosphere (d) All of above

(3) "Whole number rule" was formulated by:
(a) Prout (b) **Aston✓**
(c) J.J. Thomson (d) Neil Bohr

(4) The fact; "The atomic masses of the isotopes of an element are close to whole numbers" is called:
(a) Octet rule (b) **Whole number rule✓**
(c) Electron-electron hypothesis (d) None of these

(5) The electron kinetic energy that corresponds to a momentum of 1.1×10^{-20} kg-m/sec is:
(a) 17 MeV (b) 18 MeV
(c) 20 MeV (d) **21 MeV✓**

(6) The electrons emitted during beta decay having energies of only:
(a) **2 or 3 MeV✓** (b) 4 or 5 Mev
(c) 6 or 7 Mev (d) 8 or 9 Mev

(7) For a proton with a momentum of 1.1×10^{-20} kg m/sec, the kinetic energy is: $(T << M_0C^2)$
(a) 0.023 MeV (b) **0.23 MeV✓**
(c) 0.05 MeV (d) 0.5 MeV

(8) Nuclei with an even number of protons plus electrons should have:
(a) Half-integral spins (b) **Integral spins✓**
(c) Both half-integral & integral spins (d) None of these

(9) The proton has a magnetic moment only about ______ that of electron.
(a) **0.15 percent✓** (b) 0.25 percent
(c) 0.35 percent (d) 0.45 percent

(10) A particle with a wavelength λ of 10^{-14} m has a momentum of:
(a) 8.32×10^{-20} kg-m/sec (b) 6.86×10^{-20} kg-m/sec
(c) **6.63×10^{-20} kg-m/sec✓** (d) 6.36×10^{-20} kg-m/sec

(11) For an electro, where E >> m_0C^2 here, the corresponding kinetic energy is (IF P = 6.63×10^{-20} kg-m/sec)
(a) 121 MeV (b) **122 MeV✓**
(c) 123 MeV (d) 124 MeV

(12) For a neutron (IF momentum is equal to 6.63×10^{-20} kg-m/sec), where m_0C^2 (939 MeV) is comparable with the total energy E, the corresponding kinetic energy is:
(a) 7 MeV (b) **8 MeV✓**
(c) 9 MeV (d) 6 MeV

(13) Nuclei with odd number of protons plus electrons should have:
(a) Integral spins (b) Half-integral spins
(c) Both integral and half-integral spins (d) None of these

(14) 1 Curie =
(a) **3.70×10^{10}** (b) 2.70×10^{10} disintegrations/sec

disintegrations/sec✓

(c) 1.70×10^{12} disintegrations/sec (d) 0.70×10^{10} disintegrations/sec

(15) A nucleus undergoing radioactive decay spontaneously emits a $_2He^4$ nucleus (Alpha particle), an electron (Beta particle) or a photon (Gamma ray), thereby either:
(a) Riding itself of nuclear excitation energy
(b) Or achieving a configuration that is or will lead to one of greater stability
(c) Either (a) or (b)✓
(d) None of these

(16) The decay constant of the radioisotope whose half-life is 5 hr is:
(a) 3.0×10^{-5} sec^{-1} (b) 2.5×10^{-5} sec^{-1}
(c) 3.85×10^{-5} sec^{-1}✓ (d) 3.65×10^{-5} sec^{-1}

(17) Schrodinger's equation for the particle is:

(a) $\frac{\quad}{\quad} + \frac{2m}{\quad}(T-V)\ \Psi_{II} = 0$ ✓ (b) $\frac{\partial^2\Psi'}{\partial x^2} + \frac{2m}{2h^2}(T-V)\Psi'_{II} = 0$

(c) $\frac{2\partial^2\Psi'}{\partial x} + \frac{2m}{2h^2}(T-V)\Psi_{II} = 0$ (d) $\frac{\partial^2\Psi'}{3\partial x} + \frac{m}{h^2}(T-V)\Psi' = 0$

(18) A device for determining the energies of the electrons emitted in beta decay is called:
(a) Gamma-ray spectrometer (b) Radiation detector
(c) α-ray spectrometer (d) β-ray spectrometer✓

(19) If r is the fixed radius of curvature and B the magnetic flux density, then the electro-momentum P is given by:

(a) P = Br (b) $P = \frac{B}{r}$

(c) P = eBr✓ (d) $P = \frac{e}{Br}$

(20) The electrons emitted in beta decay often have kinetic energies comparable with the rest energy of the electron, so the relativistic formula is:

(a) $T = \sqrt{m_0^2C^4 + P^2C^2} - m_0C$ (b) $T = \sqrt{m_0C^4 + P^2C^2} + m_0C$

(c) $T = \sqrt{m_0^2C^4 + P^2C^2} + m_0C^2$ (d) $T = \sqrt{m_0^2C^4 + P^2C^2} - m_0C^2$ ✓

(21) In beta decay, linear and angular momenta are found:
(a) Not to be conserved✓ (b) To be conserved
(c) To be constant (d) None of these

(22) ______ kinds of neutron involves in Beta decay.
(a) Three (b) Two✓
(c) Four (d) Five

(23) ______ is the sole known means whereby neutrinos and antineutrinos interact with matter.
(a) Beta decay (b) Alpha decay
(c) Inverse beta decay✓ (d) Gamma decay

(24) The photons emitted by nuclei range in energy up to several MeV, and are traditionally called:
(a) Alpha rays (b) Beta rays
(c) Gamma rays✓ (d) None of these

(25) If atomic mass of iron is 55.9, then the mass of an iron atom on the average be:
(a) 9.3×10^{-27} kg/atom (b) 9.3×10^{-28} kg/atom
(c) 9.3×10^{-26} kg/atom✓ (d) 9.3×10^{-25} kg/atom

(26) A light-year (the distance of light travels in free space in a year) is equal to:
(a) 9.46×10^{12} m (b) 9.46×10^{13} m
(c) 9.46×10^{14} m (d) 9.46×10^{15} m✓

(27) In the case of the (n, r) reaction in cadmium, the level width of 0.115 ev implies a mean lifetime for

the compound nucleus of:

(a) 5.73×10^{-15} sec✓ (b) 5.0×10^{-15} sec
(c) 5.49×10^{-15} sec (d) 4.9×10^{-5} sec

(28) The neutron cross-section:
(a) Decreases with decreasing energy
(b) Increases with increasing energy
(c) Remains constant with increasing energy
(d) **Decreases with increasing energy✓**

(29) The process in which a heavy nucleus (A > ~230) splits into two lighter one is called:
(a) Beta decay (b) **Nuclear Fission✓**
(c) Alpha decay (d) Nuclear Fusion

(30) The new nuclei that results from fission are called:
(a) Fusion fragments (b) **Fission fragments✓**
(c) Both fission and fusion fragments (d) None of these

(31) A heavy nucleus undergoes fission when it:
(a) **Acquires enough energy to oscillate violently✓**
(b) Absorbs energy from an external source
(c) Becomes stable
(d) All of above

(32) The heavy fissionable nuclides, whose mass numbers are about 240, have binding energies of:
(a) 5.6 MeV/nucleon (b) 6.6 MeV/nucleon
(c) **7.6 MeV/nucleon✓** (d) 8.6 MeV/nucleon

(33) The fission fragments, whose mass numbers are near 120, have binding energies of:
(a) 6.5 MeV/nucleon (b) 7.5 MeV/nucleon
(c) **8.5 MeV/nucleon✓** (d) 9.5 MeV/nucleon

(34) Natural uranium contains only ______ percent of the fissionable isotope $_{92}U^{235}$.
(a) 0.3% (b) 0.5%
(c) 0.2% (d) **0.7%✓**

(35) A substance whose nuclei absorb energy from incident fast neutrons that collide with them without capture occurring, is called:
(a) **Moderator✓** (b) Fissionable material
(c) Control rod (d) None of these

(36) The cross-section of $_{92}U^{235}$ for fission by slow neutrons is:
(a) 450 barns (b) **550 barns✓**
(c) 650 barns (d) 750 barns

(37) Each fission in $_{92}U^{235}$ releases an average of ______ per fission.
(a) 0.5 Neutrons (b) 1.0 Neutrons
(c) 1.5 Neutrons (d) **2.5 Neutrons✓**

(38) The period of time between the release of a fission neutron and its later absorption is under a:
(a) **Milli second✓** (b) Micro second
(c) Nano second (d) Peco second

(39) $_{92}U^{238}$, on absorbing a neutron becomes:
(a) $_{92}U^{237}$ (b) $_{92}U^{235}$
(c) $_{92}U^{239}$✓ (d) $_{92}U^{240}$

(40) The fusion of hydrogen nuclei into helium nuclei can take place by:
(a) Proton-proton cycle (b) Carbon cycle
(c) **Either proton-proton cycle or carbon cycle✓** (d) None of these

(41) The initial reaction in proton-proton cycle is:
(a) $_1H^1 + {_1H^1} \rightarrow {_1H^2} + e^+ + \nu$✓ (b) $_1H^0 + {_1H^1} \rightarrow {_1H^2} + e^+ + \nu$
(c) $_1H^1 + {_1H^2} \rightarrow {_2H^3} + e^+ + \nu$ (d) None of these

(42) Self-sustaining fusion reactions can occur only under conditions of:

(a) Extreme temperature (b) Extreme pressure
(c) **Both extreme temperature and pressure✓** (d) Moderate temperature and pressure

(43) The interior temperature of the sum is estimated to be:
(a) 2×10^6 K (b) 3×10^6 K
(c) 4×10^6 K (d) 5×10^6 K

(44) The energy liberated in the fusion of light nuclei into heavier ones is often called:
(a) Atomic energy (b) Nuclear energy
(c) Thermal energy (d) **Thermonuclear energy✓**

(45) The only elementary particle for which a satisfactory theory is known is:
(a) **Electron✓** (b) Proton
(c) Neutron (d) Positron

(46) The most striking result of the Dirac theory is its result that:
(a) Electron cannot exist without neutrons
(b) Electron cannot exist without protons
(c) **Electron can exist in negative energy states✓**
(d) All of above

(47) In ______ positive electrons were actually detected in the flux of cosmic radiations at the earth's surface.
(a) 1930 (b) 1929
(c) 1931 (d) **1932✓**

(48) The positive electrons are usually called:
(a) **Positrons✓** (b) Neutrino
(c) Antineutrino (d) Mesons

(49) The formation of a positron requires a minimum energy of:
(a) **1.02 MeV✓** (b) 2.02 MeV
(c) 3.03 MeV (d) 4.04 MeV

(50) When a positron is formed, an electron:
(a) Simultaneously disappears (b) **Simultaneously appears✓**
(c) Is lost (d) None of these

(51) Experimentally electron-positron pairs are found to be produced when:
(a) **Gamma rays of hv > 1.02 MeV pass near nuclei✓**
(b) Gamma rays of hv < 1.02 MeV pass near nuclei
(c) Gamma rays of hv = 1.02 MeV pass near nuclei
(d) None of these

(52) ______ processes in all are responsible for the absorption of X and gamma rays in matter.
(a) Two (b) **Three✓**
(c) Four (d) Five

(53) Consider the following relation:

$$I = I_o e^{-\mu l}$$

According to the above relation, the intensity of the radiation:
(a) **Decreases exponentially with the thickness of the absorber. ✓**
(b) Increases exponentially with the thickness of the absorber.
(c) Decreases exponentially with the thinness of the absorber.
(d) Increases exponentially with the thinness of the absorber.

(54) The positron is often spoken of as the antiparticle of the:
(a) Proton (b) Neutron
(c) **Electron✓** (d) None of these

(55) All other known elementary particles except for the ______ and the ______ mesons have antiparticle counterparts.
(a) Photon and $\pi°$ (b) $\pi°$ and $\eta°$
(c) Photon and $\eta°$ (d) **Photon, $\pi°$ and $\eta°$✓**

(56) The antiparticle of a particle has:
(a) **The same mass, spin and lifetime if unstable.✓**
(b) The same mass, spin and lifetime if stable.
(c) The same mass, opposite spin and lifetime.
(d) The opposite mass, same spin and lifetime.

(57) The charge on the antiparticle (if any) has ______.
(a) Opposite sign and the alignment
(b) Anti-alignment between its spin and magnetic moment
(c) **Either (a) or (b)✓**
(d) None of these

(58) The annihilation of a particle-antiparticle pair:
(a) Need always result in a pair of photons
(b) **Need not always result in a pair of photons✓**
(c) Need always a quanta of nuclear forces
(d) None of these

(59) When an antiproton is annihilated with a proton or neutron:
(a) Several neutral π mesons are usually produced
(b) Several charged π mesons are usually produced
(c) Several neutral and charged π mesons are usually produced
(d) **None of these✓**

(60) The half-life of the charged π-meson is only:
(a) 1.8×10^{-6} sec (b) 1.8×10^{-7} sec
(c) **1.8×10^{-8} sec✓** (d) 1.8×10^{-9} sec

(61) The half-life of the neutral π-meson is:
(a) 7×10^{-14} sec (b) 7×10^{-15} sec
(c) 7×10^{-16} sec (d) **7×10^{-17} sec✓**

(62) Charged π mesons almost invariably decay into lighter mesons called:
(a) μ mesons (b) Neutrinos
(c) **μ mesons & neutrinos✓** (d) None of these

(63) The existence of π° meson was not established until 1950 because:
(a) Scientists had no knowledge about it
(b) It was a stable particle
(c) **The lifetime of it is very short✓**
(d) None of these

(64) Positive and negative μ mesons have:
(a) The same rest mass, 207 m_e (b) The same spin, ½
(c) **Both (a) and (b)✓** (d) None of these

(65) Both positive and negative μ mesons decay with a half-life of:
(a) 1.5×10^{-3} sec (b) 1.5×10^{-4} sec
(c) 1.5×10^{-5} sec (d) **1.5×10^{-6} sec✓**

(66) Both positive and negative μ mesons decay into:
(a) Electrons only (b) Neutrino-antineutrino pairs only
(c) **Electrons and neutrino-antineutrino pairs✓** (d) None of these

(67) The only interaction between μ mesons and matter is an:
(a) Kinetic one (b) **Electrostatic one✓**
(c) Both kinetic and electrostatic (d) None of these

(68) The majority of cosmic-ray particles at sea level are:
(a) **μ mesons✓** (b) π-mesons
(c) π° mesons (d) None of these

(69) μ meson differ significantly from the electron only:
(a) in its mass
(b) in its instability
(c) in its mass and instability✓
(d) None of these

(70) Only about ______ percent of π mesons decay directly into electrons and neutrinos.
(a) 0.001%
(b) 0.01%✓
(c) 0.1%
(d) 1.0%

(71) Charged K mesons have rest masses of:
(a) 966 m_e✓
(b) 967 m_e
(c) 968 m_e
(d) 969 m_e

(72) The half-lives of charged K mesons is:
(a) 8×10^{-7} sec
(b) 8×10^{-8} sec
(c) 8×10^{-9} sec✓
(d) 8×10^{-10} sec

(73) Which decay schemes are possible for K^+ mesons?
(a) $K^+ \rightarrow \pi^+ + \pi^+ + \pi^-$
$\rightarrow \pi^+ + \pi^0 + \pi^0$
$\rightarrow \pi^+ + \pi^0$
$\rightarrow \mu^+ + \pi^0 + \nu$ ✓
$\rightarrow \pi^+ + \nu$
$\rightarrow e^+ + \pi^0 + \nu$
(b) $K^+ \rightarrow \pi^+ + \pi^-$
$\rightarrow \pi^0 + \pi^0$
(c) $K^+ \rightarrow \pi^- + \pi^0 + \pi^+ + \pi^-$
$\rightarrow \mu^- + \nu + \pi^-$
(d) $K^+ \rightarrow e^- + \pi^0 + \nu + \pi^-$
$\rightarrow \mu^- + \mu^- + \nu$

(74) There are apparently ______ varieties of K mesons.
(a) Four
(b) Five
(c) Three
(d) Two✓

(75) The rest masses of both K_1^0 and K_2^0 mesons is equal to:
(a) 974 m_e✓
(b) 973 m_e
(c) 972 m_e
(d) 971 m_e

(76) Half-life of K_1^0 mesons is about:
(a) 7×10^{-9} sec
(b) 7×10^{-10} sec
(c) 7×10^{-11} sec✓
(d) 7×10^{-12} sec

(77) Half-life of K_2^0 mesons is about:
(a) 4×10^{-8} sec✓
(b) 4×10^{-7} sec
(c) 4×10^{-6} sec
(d) 4×10^{-5} sec

(78) Which of the following modes are known for neutral K mesons?
(a) $K_1^0 \rightarrow \pi^+ + \pi^-$
$\rightarrow \pi^0 + \pi^0$
$K_2^0 \rightarrow \pi^0 + \pi^0 + \pi^-$
(b) $K_1^0 \rightarrow \pi^+ + \pi^+ + \pi^- + \pi^-$
$\rightarrow e^- + \nu^-$
(c) $K_1^0 \rightarrow \pi^+ + \pi^-$
$\rightarrow \pi^0 + \pi^0$
$K_2^0 \rightarrow \pi^+ + \pi^- + \pi^0$
$\rightarrow \pi^0 + \pi^0 + \pi^0$
$\rightarrow \pi^- + \mu^+ + \nu$ ✓
$\rightarrow \pi^+ + \mu^- + \nu^-$
(d) None of these

$\rightarrow \pi^- + e^+ + \nu$
$\rightarrow \pi^+ + e^- + \nu^-$

(79) Elementary particles heavier than protons are called:
(a) **Hyperons✓**
(b) Mesons
(c) Photon
(d) Baryon

(80) The known hyperons fall into:
(a) Two classes Λ, Σ
(b) Three classes Λ, Σ, Ξ
(c) **Four classes Λ, Σ, Ξ, Ω✓**
(d) Five classes Λ, Σ, Ξ, Ω, ∝

(81) The spin of all hyperons except Ω is:
(a) 1/3
(b) **1/2✓**
(c) 3/2
(d) 2/3

(82) The spin of Ω hyperon is:
(a) 1/3
(b) 1/2
(c) **3/2✓**
(d) 2/3

(83) A nucleus containing a bound Λ° hyperon is called a:
(a) **Hyperfragment✓**
(b) Potofragment
(c) Mesofragment
(d) Leptofragment

(84) The Λ° have rest masses of:
(a) **2,182 m_e✓**
(b) 2,183 m_e
(c) 2,184 m_e
(d) 2,185 m_e

(85) The half-lives of Λ° is:
(a) 1.4×10^{-10} sec
(b) 1.5×10^{-10} sec
(c) 1.6×10^{-10} sec
(d) **1.7×10^{-10} sec✓**

(86) Which of the following decay modes are known for Λ°?
(a) $\Lambda^\circ \rightarrow \pi^+ + \pi^+ + \pi^-$
$\rightarrow \pi^+ + \pi^\circ + \pi^\circ$
$\rightarrow \pi^+ + \pi^\circ$
$\rightarrow \mu^+ + \pi^\circ + \nu$
$\rightarrow \mu^+ + \pi^\circ$
$\rightarrow e^+ + \pi^\circ + \nu$

(b) $\Lambda^\circ \rightarrow p + \pi^-$
$\rightarrow n + \pi^\circ$ ✓
$\rightarrow p + e^- + \nu^-$

(c) $\Lambda^\circ \rightarrow \pi^+ + \pi^-$
$\rightarrow \pi^\circ + \pi^\circ$

(d) $\Lambda^\circ \rightarrow \pi^+ + \pi^- + \pi^\circ$
$\rightarrow \pi^\circ + \pi^\circ + \pi^\circ$
$\rightarrow \pi^- + \mu^+ + \nu$
$\rightarrow \pi^+ + \mu^- + \nu^-$
$\rightarrow \pi^- + e^+ + \nu$
$\rightarrow \pi^+ + e^- + \nu^-$

(87) The spins of charged K mesons is:
(a) 1/2
(b) **0✓**
(c) 3/2
(d) −1/2

(88) Positive and negative μ mesons have spin:
(a) ½✓
(b) 0
(c) 3/2
(d) 2/3

(89) Complete the following reaction:

$\pi^\circ \longrightarrow$
(Neutral π° meson)

(a) $\pi^\circ \rightarrow \alpha + \beta$
(b) $\pi^\circ \rightarrow \mu^+ + \nu_\mu$
(c) $\pi^\circ \rightarrow \gamma + \gamma$✓
(d) $\pi^\circ \rightarrow \pi^+ + \pi^-$

(90) Choose the right option:

(a) $\mu^+ \rightarrow e^+ + \upsilon + \upsilon^-$ ✓ (b) $\mu^+ \rightarrow e^- + \upsilon + \upsilon^-$
(c) $\mu^- \rightarrow e^+ + \upsilon$ (d) $\mu^+ \rightarrow e^+ + \upsilon^-$

(91) Choose the right option:

(a) $\mu^- \rightarrow e^- + \upsilon$ (b) $\mu^- \rightarrow e^- + \upsilon^-$
(c) $\mu^- \rightarrow e^- + \upsilon + \upsilon^-$ ✓ (d) $\mu^- \rightarrow e^+ + \upsilon + \upsilon^-$

(92) The Σ^+ have rest masses of:

(a) 2,325 m_e (b) 2,326 m_e
(c) 2,327 m_e (d) **2,328 m_e** ✓

(93) Which of the following decay modes are known for Σ^+?

(a) $\Sigma^+ \rightarrow p + \pi^0$, $\rightarrow n + \pi^+$ ✓ (b) $\Sigma^+ \rightarrow p + \pi^-$, $\rightarrow n + \pi^0$
(c) $\Sigma^+ \rightarrow \pi^+ + \pi^0$, $\rightarrow \pi^+ + \mu^+$ (d) $\Sigma^+ \rightarrow \mu^+ + \upsilon$, $\rightarrow e^+ + \pi^0 + \upsilon$

(94) The spin of the Ω hyperon is:

(a) ½ (b) 2/3
(c) 0 (d) **3/2** ✓

(95) Half-life of Σ^+ hyperon is:

(a) 0.4×10^{-10} sec (b) 0.5×10^{-10} sec
(c) **0.6×10^{-10} sec** ✓ (d) 0.7×10^{-10} sec

(96) Which of the following decay modes are known for Ω^- hyperon?

(a) $\Omega^- \rightarrow \Lambda + K^-$, $\rightarrow \Xi + \pi^-$, $\rightarrow \Xi + \pi^0$ ✓ (b) $\Omega^- \rightarrow n + \pi^0$, $\rightarrow n + \pi^+ + \pi^0$
(c) $\Omega^- \rightarrow \Lambda + \pi^0$, $\rightarrow \Lambda + \pi^+ + \pi^-$ (d) $\Omega^- \rightarrow \Xi + \Xi + \pi^0$, $\rightarrow \Lambda + K^-$

(97) The Ω^- hyperon has rest mass of:

(a) **3,290 m_e** ✓ (b) 3,291 m_e
(c) 3,292 m_e (d) 3,293 m_e

(98) The Ξ^0 hyperon has rest mass of:

(a) 2,569 m_e (b) 2,570 m_e
(c) **2,571 m_e** ✓ (d) 2,572 m_e

(99) The Ξ^- has rest mass of:

(a) **2,583 m_e** ✓ (b) 2,584 m_e
(c) 2,585 m_e (d) 2,586 m_e

(100) The Σ^0 hyperon has rest mass of:

(a) 2,331 m_e (b) **2,332 m_e** ✓
(c) 2,333 m_e (d) 2,334 m_e

(101) Which of the following decay modes are known for Ξ^0 hyperon?

(a) $\Xi^0 \rightarrow \Lambda + \pi^0$ ✓ (b) $\Xi^0 \rightarrow \pi^0 + \pi^+$
(c) $\Xi^0 \rightarrow \pi^+ + \pi^-$ (d) $\Xi^0 \rightarrow \Lambda^0 + \pi^+ + \pi^-$

(102) Which of the following decay modes are known for Ξ^-?

(a) $\Xi^- \rightarrow \Lambda + \pi^-$ ✓ (b) $\Xi^- \rightarrow \Lambda + \pi^+ + \pi^0$
(c) $\Xi^- \rightarrow \Lambda + \gamma + \pi^+$ (d) $\Xi^- \rightarrow \Lambda + \gamma + \pi^-$

(103) Half-life of Ξ^0 is:

(a) 1.0×10^{-8} sec (b) 1.0×10^{-9} sec
(c) **1.0×10^{-10} sec** ✓ (d) 1.0×10^{-11} sec

(104) Half-life of Ω^- is:

(a) **$\sim 10^{-10}$ sec** ✓ (b) $\sim 10^{-11}$ sec
(c) $> 10^{-10}$ sec (d) $< 10^{-10}$ sec

(105) Half-life of Ξ^{o} is:
(a) 0.1×10^{-10} sec (b) **1.0×10^{-10} sec✓**
(c) 1.5×10^{-10} sec (d) 2.0×10^{-10} sec

(106) Half-life of Ξ^{-} is:
(a) 0.09×10^{-10} sec (b) **0.9×10^{-10} sec✓**
(c) 0.7×10^{-10} sec (d) 0.5×10^{-10} sec

(107) Half-life of Σ^{o} hyperon is:
(a) $\sim 10^{-10}$ sec (b) **$< 10^{-12}$ sec✓**
(c) $> 10^{-12}$ sec (d) $> 10^{-10}$ sec

(108) Half-life of Σ^{-} hyperon is:
(a) 0.2×10^{-10} sec (b) 1.1×10^{-10} sec
(c) **1.2×10^{-10} sec✓** (d) 1.3×10^{-10} sec

(109) Which of the following decay modes are known for Σ^{o} hyperon?
(a) **$\Sigma^{o} \rightarrow \Lambda + \gamma$✓** (b) $\Sigma^{o} \rightarrow \pi^{+} + \Lambda$
(c) $\Sigma^{o} \rightarrow \pi^{-} + \Lambda$ (d) $\Sigma^{o} \rightarrow P + e^{-} + \Lambda$

(110) A 5.30 MeV alpha particle happens, by chance, to be headed directly towards the nucleus of an atom of gold, which contains 79 protons. How close does the alpha particle get to the centre of the nucleus before coming momentarily to rest and revering its motion?
(a) **4.29×10^{-14} m✓** (b) 5.24×10^{-14} m
(c) 6.29×10^{-14} m (d) 7.24×10^{-14} m

(111) What is the binding energy per nucleon for ^{120}Sn? (If ΔE_{be} = 1020.5 MeV)
(a) 6.50 MeV/nucleon (b) 7.50 MeV/nucleon
(c) **8.50 MeV/nucleon✓** (d) 9.50 MeV/nucleon

(112) We can think of all nuclides as made up of a neutron-proton mixture that we can call nuclear matter. (If $r_o = 1.2 \times 10^{-15}$ m, m = 16.7×10^{-27} kg (mass of a nucleon)). What is the density of nuclear matter?
(a) 2×10^{15} kg/m³ (b) 2×10^{16} kg/m³
(c) **2×10^{17} kg/m³✓** (d) 2×10^{18} kg/m³

(113) The nuclide ^{131}I is radioactive, with a half-life of 8.04 days. At noon, on January 1, the activity of a certain sample is 600 Bq, determine whether the activity at noon on January 24 will be:
(a) A little less than 200 Bq (b) A little more than 200 Bq
(c) A little less than 75 Bq (d) **A little more than 75 Bq✓**

(114) Neutron was discovered by:
(a) Bohr in 1913 (b) Chadwick in 1932
(c) **Rutherford In 1920✓** (d) Compton in 1927

(115) Nucleon means:
(a) Only protons (b) Only neutrons
(c) Only electrons (d) **Both (a) and (b)✓**

(116) Unified mass scale means that atomic mass is expressed in:
(a) Kg (b) U only
(c) Atomic mass unit (d) **Both (b) and (c)✓**

(117) Tritium has:
(a) **One electron, two neutrons and one proton✓**
(b) One electron, one proton and one neutron
(c) One electron, two protons, one neutron
(d) Two electrons, one proton, one neutron

(118) The isotopes of hydrogen is/are:
(a) Protium (b) Deuterium
(c) Tritium (d) **All of these✓**

(119) The ordinary hydrogen is:

(a) called protium (b) Denoted by ^1_1H
(c) **Both (a) and (b)✓** (d) None of these

(120) The ratio of number of protons and the number of neutrons is:
(a) Almost one in lighter elements
(b) Greater than one in heavy elements
(c) Smaller than one in heavy elements
(d) **Both (a) and (c)✓**

(121) The figure 1.007276u shows the mass of an:
(a) **Proton✓** (b) Atom
(c) Electron (d) Neutron

(122) Tick the correct symbol:
(a) ^1_1H (b) ^3_2He
(c) ^1_3He (d) **Both (a) and (b)✓**

(123) The particle which is 7000 times more massive than the electron is called:
(a) **α-particle✓** (b) γ-ray
(c) Proton (d) Meson

(124) The nuclei of an element having the same charge number but different mass numbers are called:
(a) Isobars (b) **Isotopes✓**
(c) Isomers (d) Isobaric

(125) Deuterium and triton are respectively the names of:
(a) **Atom and nucleus of hydrogen✓** (b) Nucleus and atom of hydrogen
(c) Atom and nucleus of helium (d) Nuclei of hydrogen atom

(126) Neutron was suggested to be in the nucleus by:
(a) Dirac in 1928 (b) **Rutherford in 1920✓**
(c) Bohr in 1913 (d) Anderson in 1932

(127) The ratio of the radii of an atom and its nucleus is roughly equal to:
(a) 10^5 cm (b) 10^5 m
(c) **10^5 ✓** (d) 10^{-5} m

(128) In the unit of unified mass scale, the mass of an electron is:
(a) 1.007276u (b) 1.008665u
(c) **0.00055u✓** (d) 0.000055u

(129) Mass of neutron is exactly:
(a) 1.675×10^{-27} kg (b) 9.1×10^{-31} kg
(c) 1.67×10^{-19} kg✓ (d) 1.6×10^{-19} kg

(130) Charge and mass of a proton are respectively:
(a) Zero, 1.673×10^{-27} kg (b) 1.673×10^{-27} coul, 1.6×10^{-19} kg
(c) **1.6×10^{-19} coul, 1.673×10^{-27} kg✓** (d) 1.6×10^{-19} kg

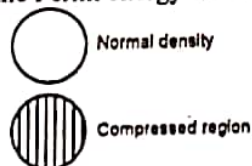
(131) Nucleus of a hydrogen atom may contain:
(a) One proton only (b) One proton and one neutron
(c) One proton and twoneutrons (d) **Any of these✓**

(132) Nucleus of a hydrogen atom may contain:
(a) **One proton only✓** (b) One neutron only
(c) Two protons and two neutrons (d) Two protons and one neutrons

(133) In a neutral atom, the number of protons are always:
(a) Greater than number of neutrons (b) Smaller than the number of electrons
(c) Equal to the number of neutrons (d) **Equal to number of electrons✓**

(134) In elementary nuclear physics, we learn about the Fermi gas model of the nucleus. The Fermi energy

for normal nuclear density P_o is 38.4 MeV. Suppose that the nucleus is compressed. For example, in a heavy ion collision. What is the dependence of the Fermi energy on density?

(a) P^2
(b) $P^{2/3}$✓
(c) It is independent of density
(d) P

(135) The μ-meson has the same charge as the electron, but a greater mass $m_\mu = 207\ m_e$. Use Bohr theory to find the radius of a μ-mesonic atom with nucleus of charge Ze orbited by the μ^- as compared to the radius of the hydrogen-like atom:

(a) $r_\mu = r_H / 207$✓ (b) $r_\mu = r_H$
(c) $r_\mu = 207\ r_H$ (d) $r_\mu = r_H / 207^2$

(136) Calculate the Q value in MeV for the nuclear reaction $^{27}Al(d,P)^{28}Al$ given that $m(^{27}Al) = 26.98154$, $m_d = 2.01473$, $m_p = 1.00794$, and $m(^{28}Al) = 27.98154$, all in a.m.u:

(a) 6.83 MeV (b) −6.83 MeV
(c) **6.32 MeV**✓ (d) 0.0 MeV

(137) The nuclide ^{232}Th decays by α particle emission with half-life $\tau = 4.45 \times 10^{17}$ s. What quantum mechanical model might be used to predict the half life?

(a) **The Wentzel-Kramers-Brillouin approximation**✓
(b) The Kroning-Penney model
(c) The nuclear shell model
(d) The compound nucleus model

(138) The lowest nucleon resonance state is the Δ which has a mass of 1232 MeV/C^2 and a width of 120 MeV. Calculate the lifetime of this I = 3/2 nucleon state:

(a) **5.5×10^{-24} s**✓ (b) 8.4×10^{-17} s
(c) 3.3×10^{-23} s (d) 1.2×10^{-19} s

(139) According to the quark model, hadrons are made up of quarks. What is the quark composition of the proton?

(a) The proton is not a hadron (b) sss
(c) $u\bar{u}$ (d) **uud**✓

(140) Identify the following elementary particle scattering cross-section curve. $\sqrt{s}$ is the total center of mass scattering energy. σ is zero below 2.014 GeV:

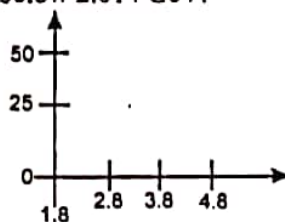
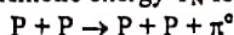



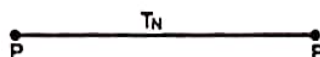
Fig.

(a) np total cross-section (b) **pp inelastic cross-section**✓
(c) pp direction cross-section (d) pp total cross section

(141) Determine the laboratory threshold Kinetic energy T_N for the reaction

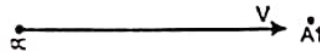
$$P + P \rightarrow P + P + \pi^o$$

The target is at rest and the projectile is accelerated to have Kinetic energy T_N. Let $m_p = m_N = .938$ GeV and $m_R = .140$ GeV:

T_N

P ———— P

(a) 140 MeV (b) 2.016 GeV
(c) **290 MeV**✓ (d) 1.038 Gev

(142) The nuclear reaction $^{27}_{13}Al(\alpha, P)\ ^{30}_{14}Si$ has a positive Q-value. Hence, energy is given off in the

reaction. Determine the minimum kinetic energy needed in the laboratory system for the reverse reaction:

∝ —V→ A1

(a) 2.7 MeV✓ (b) 3.2 MeV
(c) 1.3 MeV (d) 1.8 MeV

(143) Which of the following is NOT a true statement about the modern particle picture of the structure of matter?
(a) There are only six leptons
(b) **Taudepton number is not conserved✓**
(c) Electron lepton number is conserved
(d) There are only six quarks

(144) Which of the following is a true statement about the modern QCD quark and gluon picture of the structure of matter?
(a) **The s, c and b quarks have special quantum numbers S, C, B.✓**
(b) The d, s, b quarks have charge 2/3e.
(c) The u, c, t quarks have charge −1/3e.
(d) All six quarks have been observed in a free unconfined state.

(145) Relate the mean life τ to the decay constant λ is the theory of radioactive decay:
(a) $\tau = 1/\lambda$✓ (b) $\tau = \lambda/\text{in}(2)$
(c) $\tau = \ln(2)/\lambda$ (d) $\tau = \lambda$

(146) The amount of radiation exposure biological tissue receives is a critical physics and environmental issue. Which of the following is not a correct statement about the exposure in m rems?
(a) A dental x-ray provides a local exposure of 500 m rems.
(b) **In watching TV for a year, one is exposed to about 20 m rems.✓**
(c) Living in Denver Co., one receives about 125 m rems per year.
(d) The nature radioactivity of the body produces about 20 m rems per year.

(147) A typical Mossbauer effect setup for the case of $^{191}_{77}Ir$ where the γ-ray energy is 129 KeV and the half-life is 14 ns, calculate the normal recoil energy:
(a) **.047 eV✓** (b) 4.7 KeV
(c) 4.7 neV (d) 4.7 MeV

(148) The μ-meson has half-life $\tau_{1/2}$ = 1.5 μs. These particles are produced by the collision of cosmic rays with gas nuclei 60 km above the surface of the Earth. Find the speed parameter B with which the muons move, if only 1/8 of them reach sea level without decaying:
(a) $\beta = 0.975$ (b) $\beta = 0.99$
(c) $\beta = 0.98$ (d) $\beta = 0.99975$✓

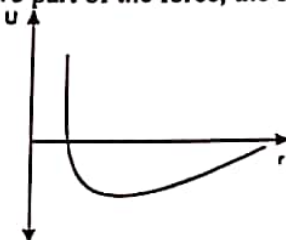
(149) A nuclear reaction occurs with 1.808 MeV deuterons incident on a target of deuterium protons are observed at $\theta = 90°$ with 3.467 MeV kinetic energy. Given that m_p = 938.791 MeV and m_d = 187ι 140 MeV. Find the mass of the triton:
(a) 2814.931 MeV (b) 2814.840 MeV
(c) **2809.462 MeV✓** (d) 2814.210 MeV

(150) Radiation safety is an important laboratory issue. Consider a whole body exposure of 10 rem received in a few hours. What is the average effect on the human body?
(a) Causes injury (b) Causes no damage
(c) **Causes detectable blood changes✓** (d) Result in quick death

(151) Many nuclei either in the ground state or in an excited state assume an ellipsoidal shape. Let Z be the number of protons in the nucleus, N the number of neutrons, e the eccentricity, a the semi-major axis, and h the semi-minor axis of the ellipse. What is the quadruple moment Q?
(a) **$2/5\, Z e^2a^2$✓** (b) $1/5\, Z e^2a^2$
(c) $3/5\, Z e^2b^2$ (d) $3/5\, N e^2a^2$

(152) The meson theory of nuclear forces suggest a nucleon potential of the from

$$U(r) = V_R e^{-k} R^r/r - ve^{-k}A^r/r$$

Determine the form of the repulsive part of the force, the so-called hard core.

(a) $V_A K_A e^{-K_A r/r}$ (b) $(V_R e^{-KR'/r})\ [K_R + 1/r]$ ✓
(c) $V_R K_R e^{-KR'/r}$ (d) $(V_A e^{-K} A^{r/r})[K_A + 1/r]$

(153) Hadrons consist of baryons and means and their structure is investigated using quantum chromo-dynamics or QCD, which of the following is NOT a correct quark assignment?

(a) P = uud (b) n = udd
(c) $\pi^+ = u\bar{s}$ ✓ (d) $J = c\bar{c}$

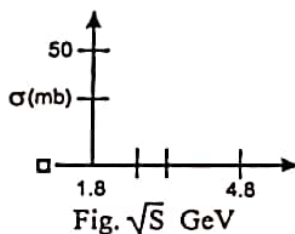
(154) Much of radioactive dating is based on the nuclear reaction

$${}^{14}_{6}C \longrightarrow {}^{14}_{7}N + e^- + \bar{v}_e$$

which has a half-life of 5760 years? What is the mean life for this reaction?

(a) **8310 years**✓ (b) 7985 years
(c) 5760 years (d) 5670 years

(155) Use your knowledge of nuclear and particle physics to determine which elementary cross-section the below curve represents.

Fig. $\sqrt{S}$ GeV

(a) **The pp total cross-section**✓ (b) The nn elastic cross-section
(c) The πn cross-section (d) The direct pn cross-section

(156) Determine the threshold kinetic energy to produce proton-antiproton pairs in positron-electron collisions. The positron K.E. is T and the target electrons are at rest.

(a) 1.876 GeV (b) **3.44 TeV**✓
(c) 0.86 TeV (d) 1.72 TeV

(157) Find the distance of closest approach for the elastic nuclear reaction

$${}^{7}_{3}Li + {}^{208}_{82}Pb$$

Assume that only the coulomb force is important. The Li nucleus is accelerated to a kinetic energy of 50.0 MeV.

(a) **7.08 fm**✓ (b) 1.12 fm
(c) 8.20 fm (d) 2.24 fm

(158) Consider the standard two body nuclear reaction $^{14}N(\alpha.P)^{17}O$ and determine the minimum kinetic energy needed (in the center of mass frame) for the reaction to occur. Given

$m = 1.007$ rm$_a$ = 40026, $m_1 = 14.0031$ and $m_o = 16.9991$ all in amu

(a) 1.1 MeV✓ (b) 1.6 MeV
(c) 2.2 MeV (d) 0.0 MeV

(159) Cosmic ray events are detected with a Geigercounter. The events occur randomly in time but with a well-defined mean rate r = 1 Hz = 1 event/s such that P/1 event occurs in (t-t + dt) = rdt. What is the probability of recording 5 counts with the Geiger counter.
(a) .057 (b) .038✓
(c) .009 (d) .019

****

Explanatory answers

(1) Option (a) is correct. He suggested this hypothesis on the basis of small number of atomic weights.
(2) Option (a) is correct.
(3) Option (b) is correct.
(4) Option (b) is correct.
(5) Option (d) is correct.
(6) Option (a) is correct.
(7) Since,

$$T << m_oC^2$$

and

$$T = \frac{P^2}{2m}$$

$$= \frac{(1.1\times10^{-20}\,kg-m/sec)^2}{2\times1.67\times10^{-27}\,kg}$$

$$= 3.6 \times 10^{-14}\text{ Joule}$$

$$= 0.23\text{ MeV}$$

So, option (b) is correct.

(8) Protons and electrons are Fermi particles with spins of 1/2, that is, angular momenta of 1/2 h. Thus, nuclei with an even number of protons plus electrons should have integral spins. So, option (b) is correct.

(9) Option (a) is correct.

(10) We know that

$$P = \frac{h}{\lambda}$$

$$= \frac{6.63\times10^{-34}\text{ Joule}-\text{sec}}{10^{-14}\,m}$$

$$= 6.63 \times 10^{-20}\text{ kg-m/sec}$$

So, option (c) is correct.

(11) We know that

$$T = PC$$

So,

$$T = 6.63 \times 10^{-20}\text{ kg-m/sec} \times 3.00 \times 10^8\text{ m/sec}$$

$$= 1.99 \times 10^{-11}\text{ Joule}$$

$$= 124\text{ MeV}$$

So, option (b) is correct.

(12) We know that

$$T = E - m_oC^2$$

$$= \sqrt{m_o^2C^4 + P^2C^2} - m_oC^2$$

Here, since

$$m_0^2C^4 = (939\text{ MeV})^2 = 88.17 \times 10^4\text{ MeV}^2$$

$$P^2C^4 = (124\text{ MeV})^2 = 1.54 \times 10^4\text{ MeV}^2$$

We have

$$T = \sqrt{(88.17+1.54)\times10^4\,MeV^2} - 939\,MeV$$
$$= 947\text{ MeV} - 939\text{ MeV}$$
$$= 8\text{ MeV}$$

So, option (b) is correct.

(13) Protons and electrons are Fermi particles with spins of 1/2, that is angular momenta of 1/2 h. Thus, nuclei with an odd number of protons plus electrons should have half-integral spins.

(14) Option (a) is correct.

(15) Option (c) is correct.

(16) We know that

$$\lambda = \frac{0.693}{T_{1/2}}$$

So,

$$\lambda = \frac{0.693}{5\,hr\times3600\,sec/hr}$$
$$= 3.85\times10^{-5}\,sec^{-1}$$

So, option (c) is correct.

(17) Option (a) is correct.

(18) Option (d) is correct.

(19) Option (c) is correct.

(20) Option (d) is correct.

(21) Option (a) is correct.

(22) Option (b) is correct.

(23) Option (c) is correct.

(24) Option (c) is correct.

(25) Option (c) is correct.

$$m_{Fe} = 55.9\ \mu/atom \times 1.66\times10^{-27}\ kg/4$$
$$= 9.3\times10^{-26}\ kg/atom$$

So, option (c) is correct.

(26) Option (d) is correct.

(27) Option (a) is correct.

$$T = \frac{1.054\times10^{-34}\,Joule-sec}{0.115\,eV\times1.60\times10^{-19}\,Joule/ev}$$
$$= 5.73\times10^{-15}\ sec$$

So, option (a) is correct.

(28) The neutron cross-section decreases with increasing energy, because the livelihood that a neutron be captured depends upon how much time it spends near a particular nucleus, which is inversely proportional to its speed. So, option (d) is correct.

(29) Option (b) is correct.

(30) Option (b) is correct.

(31) Option (a) is correct.

(32) Option (c) is correct.

(33) Option (c) is correct.

(34) Option (d) is correct.

(35) Option (a) is correct.

(36) Option (b) is correct.

(37) Option (d) is correct.

(38) Option (a) is correct.

(39) Option (c) is correct.

(40) Option (c) is correct.

(41) Option (a) is correct.

(42) Option (c) is correct.

(43) Self-sustaining fusion reactions can occur only under conditions of extreme temperature and pressure, to ensure that the participating nuclei have enough energy to react despite their mutual electrostatic repulsion and that reactions occur frequently enough to counter-balance looses of energy to the surroundings.

(44) Option (d) is correct.
(45) Option (a) is correct.
(46) Option (c) is correct.
(47) Option (d) is correct.
(48) Option (a) is correct.
(49) Option (a) is correct.
(50) Option (b) is correct.
(51) Option (a) is correct.
(52) Option (b) is correct.
(53) Option (a) is correct.
(54) Option (c) is correct.
(55) Option (d) is correct.
(56) Option (a) is correct.
(57) Option (c) is correct.
(58) Option (b) is correct.
(59) Option (d) is correct.
(60) Option (c) is correct.
(61) Option (d) is correct.
(62) Option (c) is correct.
(63) Option (c) is correct.
(64) Option (c) is correct.
(65) Option (d) is correct.
(66) Option (c) is correct.
(67) Option (b) is correct.
(68) Option (a) is correct.
(69) Option (c) is correct.
(70) Option (b) is correct.
(71) Option (a) is correct.
(72) Option (c) is correct.
(73) Option (a) is correct.
(74) Option (d) is correct.
(75) Option (a) is correct.
(76) Option (c) is correct.
(77) Option (a) is correct.
(78) Option (c) is correct.
(79) Option (a) is correct.
(80) Option (c) is correct.
(81) Option (b) is correct.
(82) Option (c) is correct.
(83) Option (a) is correct.
(84) Option (a) is correct.
(85) Option (d) is correct.
(86) Option (b) is correct.
(87) Option (b) is correct.
(88) Option (a) is correct.
(89) Option (c) is correct.
(90) Option (a) is correct.
(91) Option (c) is correct.

(92) Option (d) is correct.
(93) Option (a) is correct.
(94) Option (d) is correct.
(95) Option (c) is correct.
(96) Option (a) is correct.
(97) Option (a) is correct.
(98) Option (c) is correct.
(99) Option (a) is correct.
(100) Option (b) is correct.
(101) Option (a) is correct.
(102) Option (a) is correct.
(103) Option (c) is correct.
(104) Option (a) is correct.
(105) Option (b) is correct.
(106) Option (b) is correct.
(107) Option (b) is correct.
(108) Option (c) is correct.
(109) Option (a) is correct.
(110) Option (a) is correct.

Let

d = center-to-center distance

$E_i = E_f$ = the conservation of energy.

In this, the conservation of energy can be written as:

$$K_\alpha = \frac{1}{4\pi\varepsilon_o}\frac{q_\alpha q_{A\mu}}{d} \qquad ...(1)$$

Here

$$q_\alpha = 2e$$
$$q_{A\mu} = 79\ e$$

Re-arranging (1), we have

$$d = \frac{q_\alpha q_{A\mu}}{4\pi\varepsilon_o K_\alpha}$$

Put values, we have

$$d = \frac{(2\times 79)(1.60\times 10^{-19}C)^2}{4\pi\varepsilon_o(5.30\ MeV)(1.60\times 10^{-13}J/MeV)}$$
$$d = 4.29\times 10^{-14}\ m$$

So, option (a) is correct.

(111) Option (c) is correct.

We know that

$$\Delta E_{ben} = \frac{\Delta E_{be}}{A}$$

Put values,

$$\Delta E_{ben} = \frac{1020.5\ MeV}{120}$$
$$= 8.50\ MeV/nucleon$$

So, option (c) is correct.

(112) Option (c) is correct.

We know that,

$$\rho = \frac{m}{4/3\pi r_0^3}$$

Since,

$$m = 1.67 \times 10^{-27} \text{ kg}$$
$$\pi = 22/7$$
$$r_o = 1.2 \times 10^{-15} \text{ m}$$

Then,

$$\rho = \frac{1.67 \times 10^{-27} \text{kg}}{4/3\pi(1.2 \times 10^{-15} \text{m})^3}$$
$$\rho \approx 2 \times 10^{17} \text{ kg/m}^3$$

So, option (c) is correct.

(113) Elapsed time is a little less than three half-lives. So, option (d) is correct.
(114) (c)
(115) (d)
(116) (d)
(117) (a)
(118) (d)
(119) (c)
(120) (d)
(121) (a)
(122) (d)
(123) (a)
(124) (b)
(125) (a)
(126) (b)
(127) (c)
(128) (c)
(129) (a)
(130) (c)
(131) (d)
(132) (a)
(133) (d)
(134) (b)

The differential number of particles is

$$dN = \frac{4V}{(2\pi)^3} d^3K$$

where g = 4 is the nuclear degeneracy.

$$P = hK$$

Integrating, we get

$$N = \int_0^N$$

$$dN = \frac{4V}{(2\pi h)^3} \int_0^{P_F} 4\pi P^2 dP$$

$$D = \frac{N}{V}$$

$$= \frac{4}{(2\pi h)^3} \frac{4}{3} \pi P_F^3$$

$$P_F = h\left(\frac{3\pi^2}{2} P\right)^{1/3}$$ is the Fermi momentum and

$$E_F = \frac{P_F^2}{2m}$$

$$= \frac{h^2}{2m}\left(\frac{3\pi^2}{2}P\right)^{2/3}$$

is the Fermi energy where $m = 939\ MeV/C^2$ is the mass of the nucleon.

(135) (a)

Using $F = ma$

With $a = v^2/r$

As the centripetal acceleration and

$$F = Kq_1q_2/r^2$$

As the Coulomb force, we have

$$F = \frac{mv^2}{r} = \frac{KZe^2}{r^2}$$

From Bohr Theory,

$$L = mVT = nh$$

Thus $V = \frac{nh}{ntr}$

$$\frac{m\left(\frac{nh}{mr}\right)^2}{r} = \frac{KZe^2}{r}$$

$$r_\mu = \frac{n^2h^2}{KZe^2m\mu}$$

$$r_H = \frac{n^2h^2}{KZe^2m_e}$$

$$r_\mu = \frac{m_e}{m_\mu}r_H$$

$$= \frac{1}{207}r_H$$

where r_H is the radius of the hydrogen-like atom in Bohr theory.

(136) (c)

Consider the reaction

$$I + T \longrightarrow E + R$$

Where

I = Incident particle, T = target, E = emitted particle, and R = residue

Which is also written

$$T(I, E)R$$

The θ-value is

$$\theta = m_I + m_T - m_E - m_R$$

$= (2.01473 + 26.98154 - 1.00794 - 27.98154)$ amu $\times$ 931.502 MeV/amu

$= 6.32$ MeV.

(137) (a)

In the wkb approximation, the Schrodinger equation

$$\frac{d^2\psi(r)}{dr^2} + \frac{2m}{h^2}(E - V(r)\psi(r) = 0$$

has a solution

$$\psi(r) = e^{Ik(r)k}$$

Where

$$K(r) = \int dr\sqrt{2m(E-V(r))}$$

This may be used to find the probability for an α-particle to tunnel through the coulomb barrier.

(138) (a)

$$\Delta E = 120 \text{ MeV}$$
$$\tau = h/\Delta E$$

Using the uncertainty principle

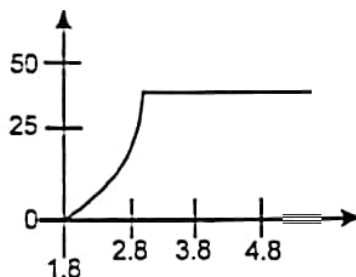
$$= 197.35/120$$
$$= 1.64\frac{fm}{C}\times\frac{10^{-13}cm}{3\times10^{10}cm/s}$$
$$\tau = 5.5\times10^{-24}\text{ s}$$

(139) (d)

The u quark has charge 2/3 and the d quark has charge −1/3. Hence the combination uud has charge

$$\frac{2}{3}+\frac{2}{3}-\frac{1}{3}=1$$

the charge of the proton.

(140) (b)

The PP inelastic cross-section rises at the point production threshold.

$$\sqrt{s} = 2.014 \text{ MeV}$$

and

approaches a constant 30 mb at high energy.

(141) (c)

$$P + P \longrightarrow P + P + \pi^0 \text{ is the given reaction.}$$

The total u-vector momentum squared is

$$(\underline{P}_1 + \underline{P}_2)^2 = \frac{-E_{cm}^2}{C^2}$$
$$= -m_1^2C^2 - m_2^2C^2 - \frac{2}{C^2}E_1E_2$$

where

Each / P $= (P.iE/C)$

Now

$$E_1 = T_1 + m_1$$

and

$$\sqrt{s} = E_{cm} = \sqrt{m_1^2 + m_2^2 + 2(T_1 + m_1)m_2}$$
$$2m_N + m_T = \sqrt{4m^{2-m^2}{}_N + 2m_N T_n}$$

Using

$$m_1 = m_2 = m_N$$
$$2(.938) + .140 = \sqrt{4(.938)^2 + 2(.938)T_N}$$

Solve for

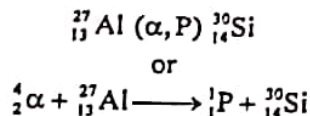
$$T_N = .290 \text{ GeV}$$
$$= 290 \text{ MeV}$$

as the answer.

(142) (a)
The nuclear reaction is

$$^{27}_{13}\text{Al}\ (\alpha, P)\ ^{30}_{14}\text{Si}$$

or

$$^{4}_{2}\alpha + ^{27}_{13}\text{Al} \longrightarrow ^{1}_{1}P + ^{30}_{14}\text{Si}$$

with 0-value

$$\theta = m_I + m_T - m_R - m_E$$
$$= (4.0026 + 26.9815 - 29.9738 - 1.0078) \times 931.502$$
$$= 2.3 \text{ MeV}$$

For the reverse reaction

$$\theta = -2.3 \text{ MeV}$$

and

$$T_{lab} = \left(1 + \frac{m_I}{m_T}\right)|\theta|$$
$$= 2.7 \text{ MeV}$$

is the minimum kinetic energy needed.

(143) (b)
There are six leptons.

$$e, u_l; \mu, v_u;$$

and

$$t, v_T$$

The electron, mu, and tau increase in mass from 0.511 MeV/C^2; to 105.6 MeV/C^2 to 1884 MeV/C^2 each has charge--e where e = 1.6×10^{-19} C is the fundamental electronic charge. The neutrinos v_1, v_μ and v_r are thought to have no mass and also have zero charge. In nuclear reactions, electron iepton number L_e, mulepton number L_μ, and tau-lepton number L_T are conserved quantities. The antileptons have opposite charge and lepton number e.g., has q = –e and L_e = 1 but e$^+$ has

$$q = +e \text{ and } L_e = -1$$

(144) (a)
There are six quarks up, down, strange, charm, bottom, and top or u, d, s, c, b, and t. The up, charm, and top quarks have charges 2/3 e and masses 350, 1800, and = 20,000 MeV/C^2. (The top quark has yet to be found.) The down, strange, and bottom quarks have charges 1/3 e and masses 350, 550, and 4500 MeV/C^2. The strange quark has strangeness S = –I, the charm quark has charm quantum number C = I, the bottom quark bottomness B = –1, and presumably the top quark has top quantum number T = 1. Hadrons like the proton and pion are built of quarks and anti-quarks.

(145) (a)
The theory of radioactive decay proceeds as follows:
Let

$$P = \text{Probability}$$

Then

$$P(1 \text{ decay}) = \lambda\, dt,$$
$$\lambda = \text{decay constant}$$

The differential number of particles decaying is

$$dN = -NP$$
$$= -\lambda \text{ Watt}$$

$$\int_{N_o}^{N} \frac{dN}{N} = -\int_{o}^{t} \lambda dt \Rightarrow N = N_o e^{-\lambda t}$$

The mean life is calculated as an expectation value

$$t = \langle t \rangle = \int_o^\infty t e^{-\lambda t} dt \Big/ \int_o^\infty e^{-\lambda t} dt$$

$$= \lambda\left[-\frac{t}{\gamma}e^{-\lambda t} - \frac{1}{\lambda^2}e^{-\lambda}\right] = \frac{1}{\lambda}$$

where

$e^{-\lambda t}$ plays the role of probability function.

(146) (b) The Roentgen is the standard unit of radiation exposure. IR is the amount of radiation which releases in 1cc of dry air at STP (.001293 g) one esu of charge (4.803×10^{-20} esu = 1.602×10^{-19} C). The REM or Roentgen-equivalent man is the amount of radiation which provides the same effect in humans as IR of x or y-rays. The statements in the problem are in milli rems or 10^{-3} REM. Note that a coast-to-coast flight, the natural radioactivity of the body and living in Denver, Colorado, are natural radiation sources whereas TV (1 m rem per year), a dental x-ray and a G.I. tract exam (7500 m rem) are obviously human-made radiation sources.

(147) (a) The Mossbauer effect, discovered by R. Mossbauer involves the resonance emission or absorption of nuclear radiation without recoil. For the usual emission.

Case $A^* \rightarrow A + Y$ the initial and final states are shown in the preceding figure. By conservation of momentum the recoil and photon momentum are equal

$$P_R = P_Y$$

Hence, the recoil energy is

$$E_R = P_R^2/2m_A$$

$$= (129 \times 10^3)^2/2\,(191)(931.5 \times 10^6)$$

$$= .0468 \text{ eV}$$

(148) (d) The altitude is

$$x = 60 \text{ km}$$

Also

$$x = ct$$

So that

$$t = \frac{60 \times 10^3}{3 \times 10^8}$$

$$t = 2 \times 10^{-4} \text{ s}$$

Every half-life, one loses one-half of the particles.

$$\left(\frac{1}{2}\right)^3 = \frac{1}{8}$$

$$\Rightarrow \quad t_o = 3 \times 1.5 \times 10^{-6}$$

$$= 4.5 \times 10^{-6} \text{ s}$$

three half-lives.

Using time dilation:

$$t = t_o Y$$

$$\Rightarrow \quad Y = \frac{2 \times 10^{-4}}{4.5 \times 10^{-6}}$$

$$Y = 44.44$$

$$\gamma = \frac{1}{\sqrt{1-\beta^2}}$$

$$\beta = \sqrt{1-\frac{1}{\gamma^2}}$$

$$\beta = 0.99975$$

$$1-\beta = 0.00025$$

(149) (c) The nuclear reaction is:

$${}^2_1H + {}^2_1H \longrightarrow {}^1_1H + {}^3_1H$$

or

$$d + d \longrightarrow p + t$$

$$T_2 = 1.808 \text{ MeV}$$

and $$T_1 = 3.467 \text{ MeV}$$

The relativistic 4-momentum must be conserved

$$(\underline{P})_o = (\underline{P})_f$$

$$\Rightarrow \quad (P_1 iE/C)_o$$

$$= (P_1 \, iE/C)_f$$

The 4th component of the 4-momentum is the total energy:

$$E_2 + m_2 = E_1 + E_3$$

The momenta components are assumed to be in the xy plane.

$$P_{2x} = P_{3x}$$

$$P_{ty} = - P_{3y}$$

$$m_3^2 = E_3^2 - P_3^2$$

$$= (E_2 + m_2 E_1)^2 - P_{2o}^1 - P_{ty}^2$$

$$= E_2^2 - P_{2x}^2 + E_1^2 - P_{ty}^2 - 2E_1E_2 + m_2^2 + 2m_2(E_2 - E_1)$$

$$= 2m_2^2 + m_1^2 + 2m_2(E_2 - E_1) - 2E_1E_2$$

We are given the mass of the deuteron and the mass of the proton:

$$m_2 = 1876.140 \text{ MeV}$$

$$m_1 = 938.791 \text{ MeV}$$

Hence,

$$E_2 = T_2 + m_2 = 1877.948 \text{ MeV}$$

and $$E_1 = T_1 + m_1 = 942.258 \text{ MeV}$$

$$m_3^2 = 2(1876.140)^2 + (938.791)^2 + 2(1876.140)$$

$$(1877.948 - 942.258) - 2(1877.948)(942.258)$$

Finally $$m_3 = 2809.462 \text{ MeV}$$

(150) (c) Radiation damage is caused by the ionization and excitation of charged particles in the body.

1 rem causes no damage
10 rem causes detectable blood changes 100 rem causes injury
400 rem results in 50% deaths in 30 days
100,000 rem results in quick death.

(151) (a) The electric quadrupe moment of a charge distribution is

$$Q = \frac{2}{5}z(a^2 - b^2)$$

where

Z = the number of protons in the nucleus,
a = the nuclear semi-major axis,

and

b = the ellipse semi-minor axis

Clearly, this factor is a measure of how elliptical the nuclear charge distribution is. The eccentricity is

$$e = \sqrt{a^2 - b^2}/a \quad \Rightarrow \quad e^2 = (a^2 - b^2)/a^2$$

Thus,

$$Q = \frac{2}{5}Ze^2a^2$$

For a circle e = 0,
The deuteron, for example, has

$$Q = .003 \text{ barn}$$

(152) (b) The Tukawa potential is based in the meson theory of nuclear forces. The relativistic wave equation

$$(\nabla^2 - \mu^2 - \frac{1}{C^2}\frac{\partial^2}{\partial t^2})I = 0$$

May be separated by

$$(I)(r, t) = \phi(r)e^{-iEt/\hbar}$$

To get

$$(\nabla^2 - \mu^2)\phi = 0$$

For a virtual particle, the radial solutions are $\phi \sim e^{-\mu r}/r$. The Tukawa potential has the same form.

$$U(r) = V_R e^{-K_R r}/r - V_A e^{-K_A r}/r$$

The repulsive part is

$$V_R e^{-K_R r}/r$$

With force

$$F = \frac{-b}{\partial r}V_R \frac{e^{-KR'}}{r}$$

$$= \frac{V_R e^{-K_R r}}{r}\left(K_r + \frac{1}{r}\right)$$

(153) (c) Hadrons are built of quarks whereas leptons are fundamental particles. Quark have spin j = 1/2 and baryon number β = 1/3. Antiquarks have the same spin, but opposite baryon number, electric charge, and isospin-u, d, s, c, b and t are the flavours of quarks: up, down, strange, charm, bottom, and top. Some common hadron configurations are

$P = uud$ $\quad \bar{P} = \overline{uud}$

$n = udd$ $\quad \bar{n} = \overline{udd}$ $\quad \Delta^{++} = uuu$

$\pi^+ = u\bar{d}$ $\quad \pi = \bar{u}d$ $\quad J = c\bar{c}$

$K^+ = u\bar{s}$ $\quad \bar{K} = \bar{u}s$

(154) (a) In radioactive decay

$$N = N_o e^{-\lambda t}$$

follows from the assumption that the decay is a random process where the probability of one decay is λdt. (This means $dN = -\lambda N dt$.) The half-life is related to the decay constant

$$N_o/2 = N_o e^{-\lambda t_{1/2}}$$

$$\Rightarrow \quad t_{1/2} = \ln(2)/\lambda$$

as is the mean life

$$\tau = \langle t \rangle = \frac{\int_0^\infty t e^{-\lambda t} dt}{\int_0^\infty e^{-\lambda t} dt}$$

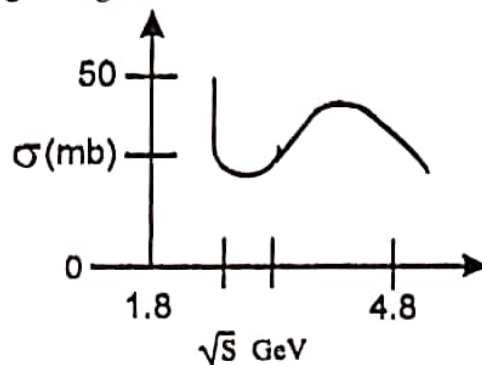
$$= \lambda\left[-\frac{t}{\lambda}e^{-\lambda t} - \frac{1}{\lambda^2}e^{-\lambda t}\right]_0^\infty = \frac{1}{\lambda}$$

Hence,

$$\tau = \frac{1}{\lambda}$$

$$= t_{1/2}/\ln(2) = 5760 \text{ yr}/\ln(2)$$

$$= 8310 \text{ yrs}$$

(155) (a) The PP total cross-section is high at low energy, has a minimum of about 24 mb, and is about 40 mb at high energies.

(156) (b) The total rest and kinetic energy of the electron-positron pair must be sufficient to account for the rest energy of the resultant proton anti-proton pair.

The particle reaction is

$$e^- + e^+ \longrightarrow P + P^-$$

$$\sqrt{s} = E_{cm}$$

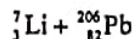
$$= \sqrt{(m_1 + m_T)^2 + 2T_{1ab}m_T}$$

$$m_P + m_P = \sqrt{(m_e + m_e)^2 + 2T_e m_e^-}$$

$$2 \times 9.39 = \sqrt{(2 \times .511)^2 + 2T_e(.511)}$$

$$T_e = 3.44 \times 10^6$$
$$\text{MeV} = 3440 \text{ GeV}$$
$$= 3.44 \text{ TeV}$$

(157) (a) The given nuclear reaction is

$${}^{7}_{3}Li + {}^{206}_{82}Pb$$

The closest point will be where the kinetic energy of the Li is converted entirely to potential energy.

$$T = \frac{1}{2}mv^2$$
$$= \frac{q_1q_2}{r}$$
$$= \frac{3(82)e^2}{r}$$
$$= \frac{246e^2}{r}$$
$$r = 246\ e^2/T$$
$$= 246(1.44 \text{ MeV} - \text{fm})/(50 \text{ MeV})$$
$$= 7.08 \text{ fm}$$

In the head-on collision, we thus see a transformation of K.E. into P.E.

(158) (a) The standard two body nuclear reaction is

$$I + T \longrightarrow E + R$$

where I is the incident nucleus, T is the target. E is the emitted particle, and R is the residual nucleus. Here the reaction is

$$\alpha + {}^{14}N \longrightarrow P + {}^{17}O$$

With θ-value

$$\theta = m_I + m_T - m_R - m_E$$
$$= (4.0026 + 14.0031 - 1.0078 - 16.9991) \text{ amu} \times 931.502 \text{ MeV/amu}$$
$$= -1.1 \text{ MeV}$$

In the center of mass reference frame, this is the minimum kinetic energy needed for the reaction to occur.

(159) (b) We are given that

P[1 event occurs in $(t, t + dt)$] = rdt

With $r = 1$ Hz

One must know that the distribution is poisson is poisson with $\lambda = rt = 10$ being the expected number of counts in $t = 10$s.

****

Nuclear Physics-II

Select the correct answer and encircle it.

ATOMIC NUCLEUS AND ISOTOPES

1. **Neutron was suggested to be in the nucleus by:**
   - (A) Rutherford in 1920✓
   - (B) Bohr in 1913
   - (C) Dirac in 1928
   - (D) Anderson in 1932
   - (E) None of these
2. **Neutron was discovered by:**
   - (A) Rutherford in 1920
   - (B) Chadwick in 1932✓
   - (C) Bohr in 1913
   - (D) Compton in 1927
   - (E) None of these
3. **The ratio of the radii of an atom and its nucleus is roughly equal to:**
   - (A) 10^5 cm
   - (B) 10^5✓
   - (C) 10^5 m
   - (D) 10^{-5} m
   - (E) 10^{-5} mm
4. **Nucleon means:**
   - (A) Only electrons
   - (B) Only neutrons
   - (C) Only protons
   - (D) Both (A) and (C)
   - (E) Both (B) and (C)✓
5. **Charge and mass of a proton are respectively:**
   - (A) zero, 1.673×10^{-27} kg
   - (B) 1.673×10^{-27} coul, 1.6×10^{-19} kg
   - (C) 1.6×10^{-19} coul, 1.673×10^{-27} kg✓
   - (D) 9.1×10^{-31} kg, 1.67×10^{-27} coul
   - (E) 1.67×10^{-19} coul, 1.6×10^{-19} kg
6. **Mass of neutron is exactly:**
   - (A) 1.675×10^{-27} kg✓
   - (B) 9.1×10^{-31} kg
   - (C) 1.67×10^{-19} kg
   - (D) 1.6×10^{-19} kg
   - (E) Either (C) or (D)
7. **In the unit of unified mass scale, the mass of an electron is:**
   - (A) 1.007276u
   - (B) 1.008665u
   - (C) 0.00055u✓
   - (D) 0.000055u
   - (E) None of these
8. **Unified mass scale means that atomic mass is expressed in:**
   - (A) Kg
   - (B) Gram
   - (C) Atomic mass unit
   - (D) u only
   - (E) Both (C) and (D)✓
9. **The figure 1.007276u shows the mass of an:**
   - (A) Atom
   - (B) Positron
   - (C) Electron
   - (D) Neutron
   - (E) Proton✓
10. **In a neutral atom, the number of protons are always:**
    - (A) Greater than number of neutrons
    - (B) Smaller than the number of electrons
    - (C) Equal to the number of neutrons
    - (D) Equal to number of electrons✓
    - (E) Greater than number of electrons
11. **Nucleus of a hydrogen atom may contain:**

(A) One neutron only
(B) Two protons and one neutron
(C) Two protons and two neutrons
(D) Any of above
(E) One proton only✓

12. Nucleus of a hydrogen atom may contain:
(A) One proton only
(B) One proton and one neutron
(C) One proton and two neutrons
(D) Any of these✓
(E) None of these

13. Tick the correct symbol:
(A) $^{1}_{1}H$
(B) $^{1}_{3}He$
(C) $^{3}_{2}He$
(D) Both (A) and (C)✓
(E) Both (A) and (B)

14. The particle which is 7000 times more massive than the electron is called:
(A) Proton
(B) γ-ray
(C) α-particle✓
(D) Meson
(E) Neutron

15. The ratio of number of protons and the number of neutrons is:
(A) Almost one in lighter elements
(B) Greater than one in heavy elements
(C) Smaller than one in heavy elements
(D) Both (A) and (C)✓
(E) Both (A) and (B)

16. The nuclei of an element having the same charge number but different mass numbers are called:
(A) Isobars
(B) Isotopes✓
(C) Isomers
(D) Isobaric
(E) Isothermal

17. The ordinary hydrogen is:
(A) Denoted by $^{2}_{1}H$
(B) Called Protium
(C) Denoted by $^{1}_{1}H$
(D) Both (B) and (C)✓
(E) Both (A) and (B)

18. Tritium has:
(A) One electron, two neutrons and one proton✓
(B) One electron, one proton and one neutron
(C) One electron, two protons, one neutron
(D) Two electrons, one proton, one neutron
(E) None of these

19. Deuterium and triton are respectively the names of:
(A) Nucleus and atom of hydrogen
(B) Atom and nucleus of helium
(C) Atom and nucleus of hydrogen✓
(D) Nuclei of hydrogen atom
(E) None of these

20. The isotope/s of hydrogen is/are:
(A) Protium
(B) Deuterium
(C) Tritium
(D) Both (A) and (B)
(E) All of these✓

21. The nucleus/nuclei of hydrogen is/are:
(A) Proton
(B) Deuteron

(C) Triton (D) All of these✓
(E) None of these

MASS DEFECT AND BINDING ENERGY

22. The ratio of mass of nucleus and the total mass of all the constituents making the nucleus is always:
(A) Equal to one (B) Less than one✓
(C) Greater than one (D) Any of these
(E) None of these

23. The total energy of the bound constituents in the nucleus is:
(A) Less than when they are free particles✓
(B) Greater than when they are free particles
(C) The same as when they are free particles
(D) Much greater than when they are free particles
(E) Infinite

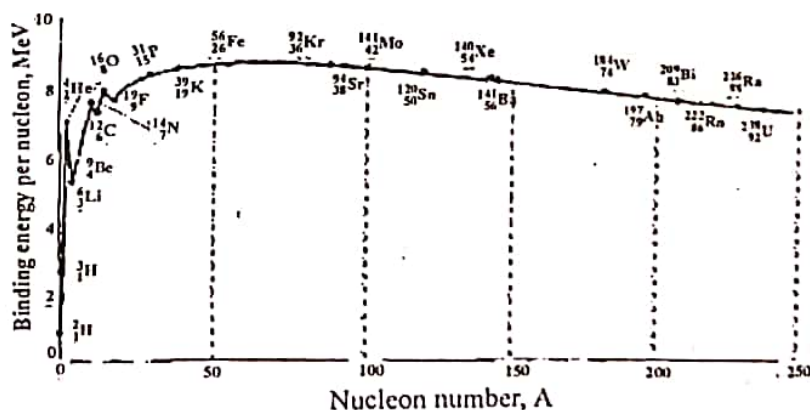
24. For Protium, the mass defect is:
(A) Infinite (B) Zero✓
(C) Very large (D) A few grams
(E) None of these

25. The energy required to breakup a helium nucleus into its two protons and two neutrons is:
(A) 28.2 eV (B) 28.2 keV
(C) 28.2 MeV✓ (D) 28.2 meV
(E) 28.2 μeV

26. The binding energy for the nucleus of deuteron is:
(A) 2.23 MeV✓ (B) 28.2 MeV
(C) 2.23 keV (D) 28.2 keV
(E) None of these

27. Referring to the figure shown, the maximum value of binding energy per nucleon is for the element of mass number:
(A) 40 (B) 58✓
(C) 150 (D) 238
(E) 250

Binding energy per nucleon, MeV

Nucleon number, A

28. Referring to the above figure, the binding energy per nucleon:
(A) Goes on increasing (B) Goes on decreasing
(C) First increases, reaches the peak and then decreases
(D) First increases, becomes nearly constant and then decreases✓
(E) None of these

29. Referring to the above figure, the maximum value of binding energy per nucleon is:

(A) 5 MeV
(B) 8.8 MeV✓
(C) 7.6 MeV
(D) 10 MeV
(E) None of these

30. Referring to the above figure, the elements which possess maximum value of binding energy are of:
(A) Low mass number
(B) Intermediate mass number✓
(C) Large mass number
(D) Very large mass number
(E) None of these

31. Referring to the above figure, iron is one of those elements for which the value of binding energy per nucleon is:
(A) Zero
(B) Maximum✓
(C) 10 MeV
(D) 7.6 MeV
(E) Both (B) and (D)

32. Referring to the above figure, uranium is a heavy element for which the value of binding energy per nucleon is:
(A) Also high
(B) Very low
(C) 7.6 MeV✓
(D) 8.8 MeV
(E) Both (A) and (D)

33. Referring to the above figure, we can say that of all the elements, the most stable element is:
(A) Phosphorus
(B) Iron✓
(C) Uranium
(D) Lithium
(E) Bismuth

34. Referring to the above figure, the binding energy per nucleon increases upto mass number equal to:
(A) 50✓
(B) 100
(C) 150
(D) 200
(E) 250

35. A large amount of energy can be obtained when:
(A) A heavy element breaks into lighter elements
(B) Lighter elements are fused to form a heavier element
(C) Either (A) or (B)
(D) Fission takes place
(E) All of these✓

RADIOACTIVITY AND HALF LIFE

36. The charge number of usually unstable elements is:
(A) Smaller than 82
(B) Greater than 82✓
(C) 25
(D) 73
(E) Smaller than 50

37. To become stable, the unstable elements emit radiations which:
(A) Are visible
(B) Affect the photographic plates
(C) Are invisible
(D) Both (A) and (B)
(E) Both (B) and (C)✓

38. Radioactivity was discovered by:
(A) Becquerel
(B) Marie Curie
(C) Pierre Curie
(D) All of them✓
(E) None of them

39. Radium was discovered by:
(A) Becquerel
(B) Marie Curie
(C) Pierre Curie
(D) Rutherford
(E) Both (B) and (C)✓

40. Marie Curie and Pierre Curie discovered:

(A) Uranium (B) Polonium
(C) Radium **(D) Both (A) and (C)✓**
(E) Plutonium

41. The radiation/s emitted by radioactive elements is/are usually:

(A) α-radiation (B) β-radiation
(C) γ-radiation (D) Light rays
(E) All except D

42. Alpha-particle:

(A) Consists of two proton, and two neutrons
(B) Is actually helium nucleus
(C) Is positively charged
(D) Is nearly four times heavier than a proton
(E) All are true✓

43. Alpha particle:

(A) Is negatively charged
(B) Is another name of deuterium
(C) Is a helium nucleus✓
(D) Lighter than a proton
(E) Heavier than six neutrons

44. β-particle:

(A) Is an electron (B) Is negatively charged
(C) Is a neutral particle **(D) Both (A) and (B)✓**
(E) None is true

45. The radiation which is not affected by electric or magnetic field may be:

(A) α-radiation (B) β-radiation
(C) γ-radiation✓ (D) protons
(E) None of these

46. The mass and charge of an α-particle is:

(A) 4u and +2e✓ (B) 2u and +4e
(C) 2u and +2e (D) 4u and +4e
(E) None of these

47. Gamma rays are electromagnetic waves nearly similar to:

(A) Waves in water **(B) X-rays✓**
(C) Mechanical waves (D) Sound waves
(E) All of these

48. The wavelength of γ-rays is:

(A) Equal to that of X-rays (B) Greater than that of X-rays
(C) Shorter than that of X-ray✓ (D) Much greater than that of X-rays
(E) Sometimes (B), sometimes (D)

49. Radioactivity is:

(A) Purely a nuclear phenomenon✓
(B) Affected by physical change
(C) Affected by a chemical reaction
(D) Both (A) and (B)
(E) Both (A) and (C)

50. The nucleus left after the emission of some radiation is called:

(A) Parent nucleus **(B) Daughter nucleus✓**
(C) Mother nucleus (D) Any of these

(E) None of these

51. During the nuclear changes, the law/s of conservation that hold/s is/are that of:
(A) Charge (B) Energy
(C) Momentum (D) Mass
(E) All of these✓

52. When certain nucleus emits an α-particle, its mass number:
(A) Increases by one (B) Decreases by one
(C) Remains same (D) Decreases by four✓
(E) Decreases by two

53. When certain nucleus emits a β-particle, its mass number:
(A) Remains same✓ (B) Increases by one
(C) Decreases by one (D) Decreases by four
(E) None of these

54. When γ-radiation is emitted by an excited nucleus, both of its charge number and mass number:
(A) Increase (B) Decrease
(C) Remain unchanged✓ (D) Both (A) and (B)
(E) None of these

55. When an α-particle is emitted by certain nucleus, the charge number of the nucleus:
(A) Decreases by four (B) Decreases by two✓
(C) Remains unchanged (D) Increases by two
(E) None of these

56. When thorium nucleus emits a β-particle, the daughter nucleus is called:
(A) Protactinium✓ (B) Actinium
(C) Uranium (D) Radium
(E) Radon

57. Tick the correct reaction:
(A) ${}^{226}_{88}Ra \rightarrow {}^{222}_{86}Rn + {}^{4}_{2}He$✓ (B) ${}^{226}_{88}Rn \rightarrow {}^{222}_{86}Ra + {}^{4}_{2}He$
(C) ${}^{222}_{86}Ra \rightarrow {}^{226}_{88}Rn + {}^{4}_{2}He$ (D) ${}^{222}_{88}Ra \rightarrow {}^{226}_{86}Rn + {}^{4}_{2}He$
(E) None of these

58. Gamma radiation:
(A) Is a photon (B) Has no mass
(C) Has no charge (D) Both (A) and (B)
(E) All are true✓

59. The unit of half life is:
(A) Pound (B) Metre
(C) Kilogram (D) Second✓
(E) Gray

60. Half life of:
(A) Ra-226 is 1620 years (B) I-131 is 8 days
(C) Radon gas is 3.8 days (D) U-239 is 23.5 minutes
(E) All are true✓

61. Half life of I-131 is 8 days and it weighs 20 mg. After 4 half lives, the amount left undecayed will be:
(A) 2.5 mg (B) 1.25 mg✓
(C) 0.625 mg (D) 0.3125 mg
(E) 5 mg

62. Half life of U-239 is:
(A) 4.5×10^9 years (B) 1620 years

(C) 8 days (D) 3.8 days
(E) **23.5 minutes✓**

63. Rate of decay is actually described by:
(A) Half life (B) Decay constant
(C) Mean life (D) Total life
(E) None of these

64. The reciprocal of decay constant λ of a radioactive material is:
(A) Frequency (B) **Half life✓**
(C) Year (D) Mean life
(E) None of these

65. The unit of decay constant is:
(A) Second (B) Metre
(C) Hour (D) Year
(E) **Second^{-1}✓**

INTERACTION OF RADIATION WITH MATTER AND RADIATION DETECTORS

66. When certain radiation passes through matter, it loses energy due to:
(A) Excitation of material atoms
(B) Ionization of material atoms due to direct collision
(C) Ionization of material atoms due to electrostatic attraction
(D) **Any of these✓**
(E) None of these

67. The magnitude of range of radiation particle through matter depends upon:
(A) Its charge (B) Its mass and energy
(C) Density of the medium (D) **All of these✓**
(E) None of these

68. Alpha particle is 7000 times more massive than:
(A) **An electron✓** (B) A proton
(C) A neutron (D) A deuteron
(E) Helium nucleus

69. Alpha particle becomes a helium atom by:
(A) Releasing two electrons (B) **Capturing two electrons✓**
(C) Capturing two protons (D) Losing two neutrons
(E) Any of these

70. Ionizing ability of α-particle is:
(A) 100 times more than that of β-particle
(B) 10 times less than that of β-particle
(C) **100 times less than that of β-particle✓**
(D) 100 times less than that of γ-radiation
(E) None of these

71. If the material through which the radiation has to pass is denser, its range will:
(A) **Be shorter✓** (B) Be longer
(C) Become independent of the density (D) Increase exponentially
(E) None of these

72. Very little ionization is caused by:
(A) α-particle (B) β-particle
(C) **γ-ray photon✓** (D) Photon
(E) Neutron

73. Dominating process is photoelectric effect when the energy of the photon interacting with photon is:
(A) **Less than 0.5 MeV✓** (B) In between 0.5 MeV and 1.02 MeV

(C) More than 1.02 MeV (D) Any of them
(E) None of these

74. **When the energy of the photon interacting with matter is more than 1.02 MeV, then the dominating process is called:**
(A) Photoelectric effect (B) Compton effect
(C) Pair production✓ (D) Any of these
(E) None of these

75. **In solids, the γ-ray intensity decreases with increasing depth of penetration in the material:**
(A) Linearly (B) Exponentially✓
(C) Squarely (D) Both (A) and (C)
(E) None of these

76. **In air, the fall of γ-ray intensity is:**
(A) Directly proportional to the distance from the source
(B) Inversely proportional to square of the distance from the source✓
(C) Inversely proportional to the distance from the source
(D) Directly proportional to the square of the distance from the source
(E) None of these

77. **The intensity I_o of a beam after passing through a distance x in the medium is reduced to intensity I given by:**
(A) $I = I_o e^{-\mu x}$✓ (B) $I = I_o x$
(C) $I = I_o e^{\mu x}$ (D) $I = I_o x^2$
(E) None of these

78. **In the equation $I = I_o e^{-\mu x}$, the symbol μ is known as:**
(A) Emission coefficient (B) Radiation coefficient
(C) Absorption coefficient✓ (D) Material coefficient
(E) None of these

79. **Gamma radiation produces fluorescence (glow) on striking a screen coated by:**
(A) Zinc sulphide (B) Sodium iodide
(C) Barium platinocyanide✓ (D) Both (A) and (B)
(E) All of these

80. **Neutrons, being neutral particles:**
(A) Do not penetrate into matter
(B) Penetrate a little
(C) Are extremely penetrating particles✓
(D) Any of these
(E) None of these

81. **Material which is used to stop the neutrons:**
(A) Contains low mass number nuclei per unit volume
(B) May be water
(C) May be plastic
(D) Either (A) or (B)✓
(E) All of these

82. **Range of β-particles in air:**
(A) Is several centimetres (B) Is several metres
(C) Obeys inverse square law of distance✓ (D) Obeys inverse law of distance
(E) None of these

83. **Gamma rays can be absorbed by:**
(A) A paper (B) 1 ~ 5mm of Al sheet
(C) 1 ~ 10 cm of lead sheet✓ (D) 1 m of lead sheet

(E) None of these

84. Speed of γ-ray photons is approximately equal to:
(A) 10^7 ms^{-1} (B) 10^8 ms^{-1}
(C) 3×10^{-8} ms^{-1} (D) 10^3 ms^{-1}
(E) **3×10^8 ms^{-1}✓**

85. Example/s of radiation detector is/are:
(A) Wilson cloud chamber (B) Geiger counter
(C) Solid state detector (D) Nuclear reactor
(E) **All except D✓**

86. Certain radiation detector makes use of the fact that supersaturated vapours condense preferentially on ions. This type of detector is called:
(A) Solid state detector (B) Nuclear reactor
(C) **Wilson cloud chamber✓** (D) Geiger counter
(E) None of these

87. In Wilson cloud chamber, α-particles leave:
(A) **Thick and continuous tracks✓** (B) Thin and discontinuous tracks
(C) No tracks (D) Thin and continuous tracks
(E) None of these

88. In Wilson cloud chamber, β-particles leave:
(A) No tracks (B) **Thin and discontinuous tracks✓**
(C) Thick and discontinuous tracks (D) Thick and continuous tracks
(E) None of these

89. The length of the cloud tracks in Wilson cloud chamber has been found to be:
(A) Inversely proportional to the energy of incident particle
(B) Directly proportional to the temperature inside the chamber
(C) **Directly proportional to the energy of the incident particle✓**
(D) Inversely proportional to the temperature inside the chamber
(E) None of these

90. To clear away all the unwanted ions from the Wilson cloud chamber, a potential difference is applied which is of the order of:
(A) 400 V (B) **1 kV✓**
(C) 10 kV (D) 100 kV
(E) 20 MV

91. Most detectors of radiation make use of the fact that:
(A) They use alcohol
(B) **Ionization is produced along the path of the particle✓**
(C) Condensation process is employed
(D) Magnetic field is used
(E) None of these

92. In Wilson cloud chamber, the air becomes saturated with:
(A) **Alcohol vapours✓** (B) Water
(C) Helium gas (D) Nitrogen gas
(E) None of these

93. In G.M. counter, the cylinder is filled with mixture of gases:
(A) Containing argon and alcohol.
(B) Containing Ne and Br
(C) At 0.1 atmospheric pressure
(D) Both (A) and (C)
(E) **All are true✓**

94. To allow the entry of α- or β-particles, one end of the G.M. tube has a:

(A) Thin mica window✓ (B) Thin glass window
(C) Airy window (D) Wooden window
(E) None of these

95. The counter, which also provides the power to the G.M. tube is called:
(A) Amplifier (B) Scalar✓
(C) Vector (D) Chamber
(E) None of these

96. The term "dead time" in case of G.M. counter means the time of the order of:
(A) Less than 1 milli sec. (B) 1 milli sec.
(C) More than 1 milli sec.✓
(D) Much less than 1 milli sec.
(E) None of these

97. In solid state detector, the reverse bias is applied through the two:
(A) Conducting layers of gold✓
(B) Conducting layers of copper
(C) Non-conducting layers of plastic
(D) Conducting layers of aluminium
(E) None of these

98. In a solid state detector, the energy needed to produce an electron-hole pair is about:
(A) 3 MeV to 4 MeV (B) 3 eV to 4 MeV✓
(C) 3 keV to 4 keV (D) 30 keV to 40 keV
(E) None of these

99. The energy needed to produce an electron-hole pair is about 3 eV to 4 eV which makes the solid state detector useful for detecting the particles of:
(A) Low energy✓ (B) Intermediate energy
(C) High energy (D) Very high energy
(E) None of these

100. The radiation detector which is suitable for fast counting is the:
(A) Wilson cloud chamber (B) G.M. Counter
(C) Solid state detector✓ (D) Both (B) and (C)
(E) All of these

101. Solid state detector has an advantage over other detectors that it is:
(A) Smaller in size (B) Operates at high voltage
(C) Operates at low voltage (D) Both (A) and (C)✓
(E) Both (B) and (C)

NUCLEAR REACTIONS, FISSION REACTION AND NUCLEAR REACTORS

102. Rutherford performed an experiment on nuclear reactions in:
(A) 1718 A.D. (B) 1818 A.D.
(C) 1918 A.D.✓ (D) 2001 A.D.
(E) 1701 A.D.

103. In his experiment on nuclear reactions, Rutherford bombarded α-particles on:
(A) Nitrogen✓ (B) Hydrogen
(C) Lead (D) Oxygen
(E) Krypton

104. A mass difference of 0.0012 u is equivalent to an energy of:
(A) 0.5 MeV (B) 1.13 MeV✓
(C) 5.13 MeV (D) 1.13 keV
(E) 1.13 eV

105. The energy of α-particle emitted by Po-214 is:
(A) 1.13 MeV (B) 7.7 MeV✓

(C) 2.23 MeV
(D) 28.2 MeV
(E) 931 MeV

106. Many nuclear reactions produced by bombarding different elements with:
(A) α-particles
(B) Protons
(C) Neutrons
(D) **Any of these✓**
(E) None of these

107. There is present in paraffin a large amount of:
(A) Nitrogen
(B) **Hydrogen✓**
(C) Carbon
(D) Beryllium
(E) Lithium

108. When U-235 is broken into barium and krypton, it is struck by a:
(A) Slow moving proton
(B) Fast moving neutron
(C) Fast moving proton
(D) **Slow moving neutron✓**
(E) None of these

109. The fission process of uranium may produce the fragments namely:
(A) Kr and Ba
(B) Sn and Mo
(C) Xe and Sr
(D) Either (A) or (B)
(E) **Any of these✓**

110. Fission reaction is possible with:
(A) U-235 only
(B) U-233 only
(C) Pu-239 only
(D) **Any of these✓**
(E) Only (B) and (C)

111. For fission purpose, the material which is mostly used is:
(A) U-238
(B) Pu-239
(C) Both (A) and (B)
(D) U-235
(E) **Both (B) and (D)✓**

112. Alongwith other products, the fission of U-235 also produces:
(A) Two neutrons
(B) Six neutrons
(C) Three neutrons
(D) **Either (A) or (C)✓**
(E) Either (A) or (B)

113. If the mass of uranium is much greater than the critical mass, the chain reaction:
(A) Proceeds at its initial speed
(B) **Proceeds at a rapid speed✓**
(C) Does not proceed
(D) Either (A) or (C)
(E) Either (A) or (B)

114. Atom bomb (i.e., nuclear bomb) works at the principle that mass of uranium is taken:
(A) Equal to critical mass
(B) **Greater than critical mass✓**
(C) Smaller than critical mass
(D) Much smaller than critical mass
(E) None of these

115. If the mass of uranium is equal to the critical mass:
(A) A huge explosion is produced
(B) Nothing happens
(C) **We get a source of energy✓**
(D) Fission chain reaction cannot proceed
(E) None of these

116. Energy in a nuclear reactor is obtained according to the principle that mass of uranium is taken:

(A) Equal to the critical mass✓
(B) Greater than critical mass
(C) Smaller than critical mass
(D) Much greater than critical mass
(E) None of these

117. To control the chain reaction in a nuclear reactor, certain rods are inserted into the reactor which are made of:
(A) Cadmium✓ (B) Lithium
(C) Sodium (D) Potassium
(E) Calcium

118. When fission takes place in the atom of uranium, then an energy is produced at the rate of:
(A) 200 MeV (B) 200 MeV per nucleon✓
(C) 10 MeV per nucleon (D) 10 eV per nucleon
(E) 10 keV per nucleon

119. Examples of the substance/s of small atomic weight is/are:
(A) Water (B) Carbon
(C) Heavy water (D) All of these✓
(E) Only (A) and (B)

120. Example/s of moderator/s used in a fission reactor is/are:
(A) Water (B) Heavy water
(C) Carbon (D) Hydrocarbon
(E) All of these✓

121. Heavy water is made of one oxygen atom and two atoms of:
(A) Protium (B) Deuterium✓
(C) Tritium (D) Any of these
(E) None of these

122. The neutron produced in a fission reaction are:
(A) Very fast and less energetic
(B) Very slow and less energetic
(C) Very fast and more energetic✓
(D) Both (B) and (C)
(E) None of these

123. Cadmium and boron rods are used as:
(A) Neutron absorbers (B) As Control Rods
(C) As moderators (D) Both (A) and (B)✓
(E) Both (B) and (C)

124. Due to chain reaction taking place in the core, the temperature of the core rises to about:
(A) 300°C (B) 1200°C✓
(C) 573K (D) Either (A) or (C)
(E) 3000°C

125. The temperature of the steam coming out of the turbine of a nuclear reactor is about:
(A) 1200°C (B) 1473K
(C) 300°C✓ (D) Either (A) or (B)
(E) 3000°C

126. The nuclear fuel once used for charging the reactor can keep it on operation continuously for:
(A) A few months✓ (B) A few days
(C) Many years (D) A few years
(E) 29 days

127. The nuclear waste can be:
(A) Dumped into oceans

(B) Allowed to get into drinking water
(C) **Stored in the bottom of old salt mines✓**
(D) Both (A) and (B)
(E) Both (B) and (C)

128. The bottom of old salt mines can be used to store the nuclear waste because they are:
(A) Wet
(B) Very dry
(C) Thousands of metres below the surface of earth
(D) **Both (B) and (C)✓**
(E) Both (A) and (C)

129. As compared to the quantity in natural uranium, enriched uranium contains greater percentage of:
(A) U–238
(B) **U–235✓**
(C) U–233
(D) U–234
(E) U–239

130. U–238 present in the natural uranium is about:
(A) 59%
(B) 0.007%
(C) **99%✓**
(D) 39%
(E) 19%

131. When a U–238 nucleus absorbs a fast neutron, it changes into:
(A) **U–239✓**
(B) Pu–239
(C) U–235
(D) U–233
(E) None of these

132. The core of fast reactors consists of a mixture of:
(A) U–233 and plutonium
(B) **Plutonium and uranium dioxide✓**
(C) Uranium dioxide and radium
(D) Radon and radium
(E) Either (A) or (C)

133. The core of fast reactors is surrounded by a blanket of:
(A) Pu–239
(B) **U–238✓**
(C) U–235
(D) Rn–226
(E) Rn–222

134. The energy given out per nucleon per fission of heavy element is about:
(A) 200 MeV
(B) 7.6 MeV
(C) **0.9 MeV✓**
(D) 8.5 MeV
(E) 25 MeV

135. In the fission of uranium, binding energy per nucleon of the fission fragments (say Kr, Ba) is:
(A) **Greater than that of uranium✓**
(B) Smaller than that of uranium
(C) Much smaller than that of uranium
(D) Equal to that of uranium
(E) None of these

136. Energy can be obtained from any nuclear reaction in which the binding energy per nucleon of the products:
(A) Decreases
(B) **Increases✓**
(C) Remains same
(D) Decreases to a larger extent
(E) None of these

FUSION REACTION

137. Energy is given out when two light nuclei are merged together to form a heavy nucleus whose mass number is:
(A) **Less Than 50✓**
(B) More Than 50
(C) 225
(D) 250

(E) All are true except A

138. When two protons and two neutrons merge to form a helium nucleus, the energy given out is equal to:
(A) 7.6 MeV (B) 0.9 MeV
(C) 20 MeV (D) 28 MeV✓
(E) 200 MeV

139. As compared to the fission reaction, the energy per nucleon given out in a fusion reaction is:
(A) Greater✓ (B) Smaller
(C) Same (D) Much smaller
(E) None of these

140. To produce fusion reaction, the energy required is:
(A) In a small amount (B) In a very small amount
(C) In a very large amount✓ (D) Is not fixed
(E) None of these

141. When two deuterons are merged to form a helium nucleus, the energy released is:
(A) 24 MeV✓ (B) 17.6 MeV
(C) 4.0 MeV (D) 3.3 MeV
(E) None of these

142. If one deuteron and one triton are forced to fuse, then the energy released is:
(A) 3.3 MeV (B) 4.0 MeV
(C) 17.6 MeV✓ (D) 24 MeV
(E) None of these

143. Consider the following fusion reaction:

$$^2_1H + ^2_1H \longrightarrow ^3_1H + ^1_1H + 4.0MeV$$

The energy released per nucleon is:
(A) 4.0 MeV (B) 3.0 MeV
(C) 2.0 MeV (D) 1.0 MeV✓
(E) None of these

144. Thermonuclear reaction takes place at:
(A) Low temperature (B) High temperature
(C) Extra-ordinary high temperature✓ (D) Very low temperature
(E) None of these

145. The Sun is composed primary of:
(A) Sodium only (B) Sodium and krypton
(C) Krypton only (D) Hydrogen and helium✓
(E) None of these

146. The temperature of core of the Sun is:
(A) 100°C (B) 20 million °C✓
(C) 5 million °C (D) 373 K
(E) Both (A) and (D)

147. The temperature at the surface of the Sun is:
(A) 100°C (B) 373K
(C) 5 million °C✓ (D) Both (A) and (B)
(E) 20 million °C

148. The ratio of the temperature at the surface of the Sun to the temperature of the core of the Sun is:
(A) One (B) 0.5
(C) 0.25✓ (D) 0.1
(E) 0.25°C

149. In p-p fusion chain reaction, the energy given out is:
(A) 25.7 MeV
(B) 6.4 MeV/nucleon
(C) 17.6 MeV
(D) 1.0 MeV/nucleon
(E) Both (A) and (B)✓

RADIATION EXPOSURE AND THEIR BIOLOGICAL EFFECTS

150. The chemical CFC is used in:
(A) Refrigeration
(B) Aerosol spray
(C) Plastic foam industry
(D) Both (A) and (C)
(E) All of these✓

151. Radioactive radon gas enters buildings from the:
(A) Water
(B) Air
(C) Ground✓
(D) Human respiration
(E) None of these

152. Many types of food contain:
(A) Potassium-40
(B) C-14
(C) Lithium
(D) Both (A) and (B)✓
(E) None of these

153. Source of cosmic radiation is:
(A) Outer space
(B) Naturally occurring radioactive substances in the Earth's crust
(C) Water
(D) Both (A) and (B)✓
(E) Both (B) and (C)

154. Cosmic radiation consists of:
(A) High energy charged particles
(B) Electromagnetic radiations
(C) Protons only
(D) Electrons only
(E) All of these✓

155. The ozone layer in the upper atmosphere protects us from:
(A) Visible light
(B) Ultraviolet light✓
(C) Violet light
(D) Red light
(E) Blue light

156. Radiation may enter into the environment by:
(A) X-ray exposures
(B) Radioactive wastes
(C) Colour television
(D) Tobacco leaves
(E) All of these✓

157. One becquerel means:
(A) 3.7×10^{10} disintegrations/sec
(B) One disint. s^{-1}
(C) 60 disint. s^{-1}✓
(D) Either (A) or (B)
(E) 7.3×10^{10} disint. s^{-1}

158. Neutrons are particularly more damaging to:
(A) Legs
(B) Eyes✓
(C) Hair
(D) Hands
(E) None of these

159. The product of absorbed dose and certain 'quality factor' is known as:
(A) Equivalent dose✓
(B) Sievert
(C) RBE
(D) Activity
(E) Both (A) and (D)

160. Gray is a unit of:
(A) Absorbed dose✓
(B) Equivalent dose

(C) RBE (D) Activity
(E) None of these

161. If D is the absorbed dose, D_e is equivalent dose, then the relation between them is:
(A) $D = D_e \times RBE$
(B) $D_e = D \times RBE$ ✓
(C) $RBE = D \times D_e$
(D) Any of these
(E) None of these

162. If E is the energy absorbed from ionizing radiation and m is mass of absorbing body, then tick the correct answer:
(A) $E = mD$
(B) $D_e = D \times R_{Be}$
(C) 1 rem = 0.01 Sv
(D) 1 rad = 0.01 Gy
(E) All are correct ✓

163. The background radiation to which we are exposed on the average is 2 m Sv per:
(A) Year ✓
(B) Hour
(C) Month
(D) Week
(E) Day

164. Low levels of radiation causes:
(A) A drop in the white blood cells
(B) Anaemia
(C) Mutation
(D) Eye cataracts
(E) All of these

165. High levels of radiation may cause:
(A) Anaemia
(B) Mutation
(C) Leukaemia
(D) Disruption of blood cells
(E) All of these ✓

166. For same absorbed dose, alpha particles are:
(A) 100 times more damaging than X-rays
(B) 20 times less damaging then X-rays
(C) 20 times more damaging than X-rays ✓
(D) 100 times less damaging than X-rays
(E) None of these

USES OF RADIATIONS

167. Radio-isotopes of many elements are used in:
(A) Medicine
(B) Agriculture
(C) Scientific research
(D) Industries
(E) All of these ✓

168. Through the use of radiation-induced mutations, the farmer has developed the improved varieties of:
(A) Rice
(B) Chickpea
(C) Cotton
(D) All of these ✓
(E) Only (A) and (C)

169. By the use of radio-induced mutation, the plants:
(A) Have shown more resistance to diseases
(B) Give better yield and grain quality
(C) Have shown more resistance to pest
(D) All of these ✓
(E) None of these

170. Carbon-14 releases:
(A) Alpha radiation
(B) β-radiation ✓
(C) Neutrons
(D) Protons
(E) All of these

171. The tracer technique has been used to identify faults in the underground pipes of the fountain system of:

(A) Maqbara Jahangeer
(B) Badshahi Mosque
(C) Minar Pakistan
(D) Shalimar Gardens of Lahore✓
(E) None of these

172. **Radio-iodine is absorbed mostly by:**
(A) Liver
(B) Bones
(C) Thyroid gland✓
(D) Brain
(E) Eyes

173. **Cobalt-60 is absorbed mostly by:**
(A) Liver✓
(B) Thyroid gland
(C) Bones
(D) Eyes
(E) Brains

174. **Bones absorb mostly the:**
(A) Radio cobalt
(B) Radio-phosphorous✓
(C) Radio-iodine
(D) Hydrogen
(E) Sodium

175. **As compared to the amount absorbed by the normal thyroid gland, a diseased or hyperactive gland absorbs radio-iodine:**
(A) 1.5 times more
(B) More than twice✓
(C) 100 times more
(D) 1000 times more
(E) None of these

176. **Circulation of blood can be studied by using radioactive isotope namely:**
(A) Na-24✓
(B) I-131
(C) C-14
(D) P-32
(E) U–239

177. **Cancerous cells that multiply rapidly:**
(A) Absorb more radiations
(B) Are more easily destroyed by ionizing radiation
(C) Absorb less radiations
(D) Both (A) and (B)✓
(E) Both (B) and (C)

178. **Radio-isotopes used for treatment of skin cancer are:**
(A) P-32 and Sr-90✓
(B) I-131 and Co-60
(C) C-14 and U-235
(D) Any of above
(E) None of these

179. **Radio-isotopes used for the treatment of the cancer of thyroid gland is:**
(A) I-131✓
(B) P-32
(C) Sr-90
(D) Co-60
(E) C-14

BASIC FORCES OF NATURE

180. **The phrase "wheels within wheels" about the quest of the man was used by the scientist:**
(A) Kirchhoff
(B) Rutherford
(C) Feynman✓
(D) Anderson
(E) Bohr

181. **The electric and magnetic forces were unified by:**
(A) Bohr
(B) Faraday and Maxwell✓
(C) Hertz and Rutherford
(D) Bohr and Rutherford
(E) None of these

182. **The force which is also called a long-range force is:**
(A) Electromagnetic force✓
(B) Strong nuclear force
(C) Weak nuclear force
(D) Both (A) and (B)
(E) Both (B) and (C)

183. **The force which is called short range force, is:**
   (A) Electromagnetic force
   (B) Strong nuclear force
   (C) Weak nuclear force
   (D) Both (A) and (B)
   (E) Both (B) and (C)✓

184. **Electromagnetic force:**
   (A) Causes all chemical reactions
   (B) Binds together the atoms and the molecules
   (C) Explains friction, cohesion and adhesion
   (D) All of these✓
   (E) None of these

185. **The force responsible for "spontaneous breaking up" of the radioactive elements is the:**
   (A) Electromagnetic force
   (B) **Weak nuclear force✓**
   (C) Gravitational force
   (D) Strong nuclear force
   (E) None of these

186. **The force which keeps atmosphere fixed to the surface of the plant is the:**
   (A) Electromagnetic force
   (B) Strong nuclear force
   (C) Gravitational force✓
   (D) Weak nuclear force
   (E) None of these

187. **The ocean tides are due to:**
   (A) Gravitational force✓
   (B) Electromagnetic force
   (C) Weak nuclear force
   (D) Strong nuclear force
   (E) None of these

188. **The physics Nobel Prize was awarded to Glashow, Weinberg and Abdulsalam for the unification of:**
   (A) Electric and magnetic forces
   (B) Electromagnetic and weak nuclear forces✓
   (C) Electromagnetic and strong nuclear force
   (D) Strong and weak nuclear forces
   (E) None of these

189. **The physics Nobel Prize was awarded on the unification of forces in:**
   (A) 1969
   (B) 1979✓
   (C) 1989
   (D) 1999
   (E) 1959

190. **Weak nuclear force is:**
   (A) Is a repulsive force
   (B) Has very short range ~ 10^{-17} m
   (C) Masked by the effect of strong nuclear force
   (D) Masked by the effect of electromagnetic force
   (E) **All of these✓**

191. **The expected grand unified force, called electronuclear force is the union of:**
   (A) Electromagnetic and strong nuclear forces
   (B) **Electro weak and strong nuclear forces✓**
   (C) Electric and weak nuclear forces
   (D) Magnetic and weak nuclear forces
   (E) None of these

BUILDING BLOCKS OF MATTER

192. **Which are not the elementary particles?**
   (A) Photons
   (B) Leptons
   (C) **Hadrons✓**
   (D) Quarks
   (E) None of these

193. Hadrons are:
(A) Elementary particles
(B) Sub-atomic particles✓
(C) Molecules
(D) Radicals
(E) None of these

194. All matter belongs to:
(A) Quark group
(B) Lepton group
(C) Hadron group
(D) Both (A) and (B)✓
(E) Both (B) and (C)

195. Hadrons are:
(A) Protons
(B) Neutrons
(C) Mesons
(D) The particles that experience a strong nuclear force
(E) Any of these✓

196. The particles equal in mass or greater than proton are called:
(A) Baryons✓
(B) Mesons
(C) Both (A) and (B)
(D) Positron
(E) Both (B) and (D)

197. Leptons are:
(A) Electron
(B) Muons
(C) Neutrons
(E) The particles that do not experience strong nuclear force✓
(E) Any of these

198. Quarks are the basic building blocks of baryons and meson. This was proposed by:
(A) M. Gell-Mann
(B) Heisenberg
(C) G. Zweig
(D) Both (A) and (C)✓
(E) Both (B) and (C)

199. A pair of quark and antiquark makes a:
(A) Meson✓
(B) Baryon
(C) Proton
(D) Neutron
(E) None of these

200. Three quarks make:
(A) An electron
(B) A meson
(C) A baryon✓
(D) A photon
(E) None of these

****

Solid State Physics

Select the correct answer and encircle it.

CLASSIFICATION OF SOLIDS

1. Crystalline solids are in the form of:
   - (A) Metals
   - (B) Ionic Compounds
   - (C) Ceramics
   - (D) Both (A) and (B)
   - (E) All of these✓
2. The solids are classified as:
   - (A) Metals
   - (B) Crystalline
   - (C) Amorphous
   - (D) Polymeric
   - (E) All except A✓
3. Zirconia is classified as:
   - (A) Ceramic solid✓
   - (B) Ionic Compound
   - (C) Metal
   - (D) Either (A) or (B)
   - (E) Either (B) or (C)
4. Each atom in a metal crystal vibrates about a fixed point with an amplitude that:
   - (A) Decreases with rise in temperature
   - (B) Is not affected by rise in temperature
   - (C) Increases with rise in temperature✓
   - (D) Both (B) and (C)
   - (E) None of these
5. The transition from solid to liquid is actually from:
   - (A) Order to disorder✓
   - (B) Disorder to order
   - (C) Order to order
   - (D) Disorder to disorder
   - (E) None of these
6. The transition from solid state to liquid state is:
   - (A) Abrupt
   - (B) Slow
   - (C) Continuous
   - (D) Discontinuous
   - (E) Both (A) and (D)✓
7. The force which maintains the strict long-range order between atoms of a crystalline solid is the:
   - (A) Nuclear force
   - (B) Cohesive force✓
   - (C) Adhesive force
   - (D) Coulomb force
   - (E) None of these
8. The word amorphous means:
   - (A) Without any structure✓
   - (B) With Definite Structure
   - (C) Regular arrangement of molecules
   - (D) Both (B) and (C)
   - (E) None of these
9. Amorphous solids:
   - (A) Have definite melting point
   - (B) Are called glassy solids
   - (C) Have no definite melting point✓
   - (D) Both (B) and (C)
   - (E) Both (A) and (C)

10. An ordinary glass gradually softens into a 'paste-like' state before it becomes a very viscous liquid. It happens almost at:
    - (A) 800°C✓
    - (B) 500°C
    - (C) 300°C
    - (D) 100°C
    - (E) None of these

11. The pattern of a crystalline solid is:
    - (A) One dimensional
    - (B) Two dimensional
    - (C) Three dimensional✓
    - (D) Either (A) or (B)
    - (E) None of these

12. In a cubic crystal, all the sides meet at:
    - (A) 60°
    - (B) 90°✓
    - (C) 109°
    - (D) 30°
    - (E) 10°

13. The arrangement or molecules or atoms in a crystalline solid can be studied by using:
    - (A) Chemical methods
    - (B) Neutrons
    - (C) X-ray techniques✓
    - (D) Copper atoms
    - (E) Both (A) and (B)

14. A unit cell is the smallest basic structure which is:
    - (A) One dimensional
    - (B) Two dimensional
    - (C) Three dimensional✓
    - (D) Four dimensional
    - (E) None of these

15. Tick the one which is not a crystalline solid:
    - (A) Zirconia
    - (B) Glass✓
    - (C) Copper
    - (D) Ceramic solid
    - (E) An ionic compound

16. The temperature at which the vibrations become so great that structure of the crystal breaks up, is called:
    - (A) Critical temperature
    - (B) Temperature of vaporization
    - (C) Melting point✓
    - (D) Both (A) and (C)
    - (E) Both (A) and (B)

17. The whole structure obtained by the repetition of unit cells is called:
    - (A) Crystal lattice✓
    - (B) Amorphous solid
    - (C) Polymeric solid
    - (D) Polystrene
    - (E) None of these

18. The pattern of NaCl particles have a shape which is:
    - (A) Cubic
    - (B) Body centred cubic
    - (C) Simple cubic
    - (D) Face centred
    - (E) Both (A) and (C)✓

19. In crystalline solids, atoms are held about their equilibrium positions depending upon the strength of:
    - (A) Adhesive forces
    - (B) Nuclear forces
    - (C) Inter atomic cohesive force✓
    - (D) Electromagnetic force
    - (E) None of these

20. The smallest three dimensional basic structure is called:
    - (A) An atom
    - (B) Unit cell✓
    - (C) Crystal lattice
    - (D) Polymer

(E) None of these

21. Each atom in a metal crystal:
(A) Remains fixed
(B) Vibrates about a fixed point✓
(C) Moves randomly
(D) Rotates about centre of the crystal
(E) None of these

22. When relatively simple molecules are chemically combined into massive molecules, the reaction is called:
(A) Fission reaction
(B) Fusion reaction
(C) Polymerization reaction✓
(D) Any of these
(E) None of these

23. The structure of polymeric solid is:
(A) An ordered structure
(B) A disordered structure
(C) Intermediate between order and disorder✓
(D) Any of these
(E) None of these

24. Examples of polymeric substances are:
(A) Plastic
(B) Synthetic rubbers
(C) Zirconia
(D) Both (A) and (B)✓
(E) Both (A) and (C)

25. Examples of crystalline solids are:
(A) Copper
(B) NaCl
(C) Zirconia
(D) All of these✓
(E) Both (A) and (B)

26. Polymers are the physical combinations of carbon with:
(A) Oxygen only
(B) Hydrogen
(C) Nitrogen
(D) All of these
(E) None of these✓

27. Examples of polymers are:
(A) Polythene
(B) Polystrene
(C) Nylon
(D) All of these✓
(E) None of these

28. Polymers are the chemical combination of carbon with:
(A) Nitrogen
(B) Oxygen
(C) Hydrogen
(D) All of these✓
(E) None of these

29. Polymers are the chemical combination of carbon with:
(A) Metallic elements
(B) Non-metallic elements
(C) Wholly with O, N, H
(D) In part with O, N, H
(E) All are true✓

30. Polymers have specific gravity which is:
(A) Low as compared to even the lightest metal✓
(B) High as compared to the heaviest metal
(C) Intermediate
(D) Any of these
(E) None of these

31. Tick the one which is not a polymeric solid:
    (A) Zirconia (B) Polythene
    (C) Nylon (D) Synthetic rubber
    (E) None of these✓

MECHANICAL PROPERTIES OF SOLIDS

32. When a body is subjected to some external force, deformation is produced in:
    (A) Shape (B) Length
    (C) Volume (D) Any of these✓
    (E) None of these
33. The ability of a body to return to its original shape (after the force is removed) is called:
    (A) Elasticity✓ (B) Ductility
    (C) Stress (D) Strain
    (E) Any of these
34. Stress is defined in terms of:
    (A) Applied force✓ (B) Deformation
    (C) Formation (D) Any of these
    (E) None of these
35. The result of mechanical tests are usually expressed in terms of:
    (A) Stress (B) Applied force
    (C) Strain (D) Deformation
    (E) All of these✓
36. Strain is defined in terms of:
    (A) Formation (B) Deformation✓
    (C) Area (D) Newtons
    (E) None of these
37. Stress may cause a change in:
    (A) Length (B) Volume
    (C) Shape (D) Any of these✓
    (E) None of these
38. When the stress changes length of a body, it is called:
    (A) Shear stress (B) Tensile Stress✓
    (C) Volume stress (D) Any of these
    (E) None of these
39. When the stress changes shape of the body, it is called:
    (A) Tensile stress (B) Volume stress
    (C) Shear stress✓ (D) Any of these
    (E) None of these
40. Which of the quantity is dimensionless?
    (A) Strain✓ (B) Stress
    (C) Modulus of elasticity (D) Work
    (E) Entropy
41. Pascal is:
    (A) Unit of stress (B) Unit of pressure
    (C) Equal to Nm^{-2} (D) Both (B) and (C)
    (E) All of these✓

42. Stress may be:
(A) Tensile
(B) Compressive
(C) Compressible
(D) All of these
(E) Both (A) and (B)✓

43. A stress which is along one dimension is known as:
(A) Tensile stress
(B) Linear stress
(C) Compressive stress
(D) Both (A) and (C)
(E) Both (A) and (B)✓

44. A stress which decreases the length along one dimension is known as:
(A) Compressive stress
(B) Tensile stress
(C) Linear stress
(D) Linear stress✓
(E) Both (B) and (C)

45. The SI unit of stress is the some as that of:
(A) Pressure✓
(B) Momentum
(C) Impulse
(D) Change in momentum
(E) Force

46. The dimension of stress is:
(A) $[ML^{-1}T^{-1}]$
(B) $[ML^{-1}T^{-2}]$✓
(C) $[ML^{2}T^{-2}]$
(D) $[ML^{2}T^{-3}]$
(E) $[MLT^{-1}]$

47. Nm^{-2} is approximately called:
(A) Tesla
(B) Weber
(C) Pascal✓
(D) Watt
(E) Gauss

48. Force applied on a unit area of a body to produce any change in its shape, volume or length of a body is called:
(A) Strain
(B) Stress✓
(C) Young's modulus
(D) Bulk modulus
(E) Either (C) or (D)

49. Change in length divided by original length is called:
(A) Stress
(B) Young's modulus
(C) Strain✓
(D) Both (B) and (C)
(E) None of these

50. Which of the following have the some unit?
(A) Stress
(B) Strain
(C) Modulus of elasticity
(D) Both (A) and (C)✓
(E) Both (A) and (B)

51. Young's modulus is the ratio of:
(A) Tensile stress to tensile strain
(B) Compressive stress to compressive strain
(C) $\frac{F/A}{\Delta V/V}$
(D) Both (A) and (C)
(E) Both (A) and (B)✓

52. When the opposite faces of a rigid cube are subjected to shear stress, the shear strain produced is given by:

(A) $\gamma = \frac{\Delta a}{a}$ (B) $\gamma = \tan\theta$
(C) $\gamma = \frac{a}{\Delta a}$ (D) Both (A) and (B)✓
(E) Both (B) and (C)

53. **The symbol K and G have been used to denote respectively:**
(A) Young's modulus and bulk modulus
(B) Young's modulus and shear modulus
(C) **Bulk modulus and shear modulus**✓
(D) Any of these
(E) None of these

54. **Bulk modulus is involved when the deformation is:**
(A) One dimensional (B) Two dimensional
(C) Three dimensional✓ (D) Any of these
(E) None of these

55. **Modulus elasticity of any material is of the order of:**
(A) 10^5✓ (B) 10^2
(C) 10^{-2} (D) 10^{-5}
(E) 10^{-10}

56. **The value of young's modulus in Nm^{-2} for water is:**
(A) 70×10^5 (B) Zero✓
(C) 2.2×10^5 (D) 91×10^5
(E) None of these

57. **The value of young's modulus is maximum for:**
(A) Diamond✓ (B) Copper
(C) Ice (D) Mercury
(E) Water

58. **The value of shear modulus is zero for:**
(A) Water (B) Mercury
(C) Diamond (D) Both (A) and (B)✓
(E) Both (A) and (C)

59. **Which of the following/s is/are expressed in Nm^{-2}?**
(A) Young's modulus (B) Bulk modulus
(C) Shear modulus (D) Both (A) and (B)
(E) All of these✓

60. **The dimension of all types of modulus of elasticity is:**
(A) $[ML^{-1}T^{2}]$✓ (B) [MLT]
(C) $[ML^{-1}T^{-1}]$ (D) $[ML^{2}T^{-2}]$
(E) $[ML^{1}T^{2}]$

61. **Substances which undergo plastic deformation until they break are called:**
(A) Ductile✓ (B) Brittle
(C) Malleable (D) Soft
(E) Hard

62. **An example of a brittle substance is:**
(A) Water (B) Glass✓
(C) Lead (D) Copper

(E) Wrought iron

63. Example/s of ductile substances is/are:
(A) Lead
(B) Wrought Iron
(C) High carbon steel
(D) **Both (A) and (B)✓**
(E) Both (A) and (C)

64. The substances which break just after the elastic limit is reached are known as:
(A) Ductile
(B) **Brittle✓**
(C) Malleable
(D) Hard
(E) Soft

65. In a tensile test, a curve is plotted automatically on X-Y chart recorder. This curve is called:
(A) Stress-strain curve
(B) Stress-volume curve
(C) Force-shear curve
(D) Force-elongation diagram
(E) **Both (A) and (D)✓**

66. Stress-strain curve for a brittle substance:
(A) Is a straight line
(B) Is parabolic
(C) Is exponential
(D) **Cannot be drawn✓**
(E) None of these

67. Glass and high carbon steel are examples of:
(A) Malleable substances
(B) Ductile substances
(C) **Brittle substances✓**
(D) Hard substances
(E) None of these

68. For practical purposes, the proportional limit for a ductile material is:
(A) **Identical with the elastic limit✓**
(B) Greater than elastic limit
(C) Smaller than elastic limit
(D) Any of these
(E) None of these

69. Stress is directly proportional to strain within the elastic limits. This statement is called:
(A) Boyle's law
(B) Newton's law of cooling
(C) **Hooke's law✓**
(D) Pascal's law
(E) None of these

70. When the specimen does not recover its original shape after the stress is removed, its behaviour is called:
(A) Elasticity
(B) **Plasticity✓**
(C) Ductility
(D) Deformation
(E) None of these

71. Elastic deformation is:
(A) Actually no deformation
(B) **Temporary deformation✓**
(C) Permanent deformation
(D) Plastic deformation
(E) None of these

72. Yield stress is another name of:
(A) Proportional limit
(B) **Elastic limit✓**
(C) Both (A) and (B)
(D) Plasticity
(E) Both (A) and (D)

73. The ultimate tensile strength (UTS) is the:
(A) Maximum strength that a material can withstand

(B) Nominal strength that a material can withstand
(C) Minimum strength
(D) Both (B) and (C)
(E) **Both (A) and (B)✓**

74. **Once the stress is increased than UTS, the material falls into the region of:**
(A) Elastic limit
(B) Proportional limit
(C) **Fracture stress✓**
(D) Both (A) and (B)
(E) None of these

75. **The strain of magnitude 4.4×10^{-4} has been noted when certain stress is applied on a wire of length 11 metres. The wire is then stretched by an amount of:**
(A) **4.84 m✓**
(B) 4.84 cm
(C) 4.84 mm
(D) 4.84 μm
(E) 4.84 km

76. **A steel wire 12 mm in diameter is stretched by a force of 113 N. The tensile stress thus applied is:**
(A) 10^{-6} Nm^{-2}
(B) **1 M Pa✓**
(C) 0.5 M Pa
(D) 0.5×10^{6} Pa
(E) Both (C) and (D)

77. **The area method for finding strain energy is useful for:**
(A) Linear part of the force-extension graph
(B) Elastic part
(C) Non-linear part
(D) Non-elastic
(E) **All of these✓**

78. **The strain energy in a deformed wire is actually the gain in the:**
(A) **P.E. of its molecules✓**
(B) K.E. of its molecules
(C) Nuclear energy of its molecules
(D) Electrical energy of its molecules
(E) None of these

ELECTRICAL PROPERTIES OF SOLIDS

79. **The metals have conductivities of the order of:**
(A) **10^{7} $(\Omega m)^{-1}$✓**
(B) 10^{-6} $(\Omega m)^{-1}$
(C) 10^{7} Ωm
(D) 10^{-10} $(\Omega m)^{-1}$
(E) 10^{-40} Ωm

80. **The insulators have conductivities which:**
(A) Are very low
(B) Range from 10^{-10} to 10^{-20}
(C) Range from 10^{-6} to 10^{-4}
(D) **Both (A) and (B)✓**
(E) Both (A) and (C)

81. **The semi conductors have conductivities, which:**
(A) Are intermediate
(B) Range from 10^{-6} to 10^{-4} $(\Omega m)^{-1}$
(C) **Both (A) and (B)✓**
(D) 10^{-10} to 10^{-20}
(E) Both (A) and (D)

82. **The example/s of conductors is/are:**
(A) **Copper✓**
(B) Diamond

(C) Wood
(D) Germanium
(E) Both (A) and (D)

83. The example/s of insulator is/are:
(A) Zinc
(B) Diamond
(C) Wood
(D) Both (B) and (C)✓
(E) Both (A) and (C)

84. Tick the material which is not a semi conductor:
(A) Indium
(B) Diamond✓
(C) Germanium
(D) Silicon
(E) Both (C) and (D)

85. The successful theory to explain completely the vast diversity in the electrical behaviour of the solids is:
(A) Free electron theory
(B) Energy band theory✓
(C) Bohr's theory of atomic structure
(D) Both (A) and (B)
(E) Both (A) and (C)

86. The electrons in the outer most shell of an atom are called:
(A) Valence electrons✓
(B) Conduction electrons
(C) Free electrons
(D) Both (A) and (C)
(E) None of these

87. Valence band:
(A) Contains valence electrons
(B) Is the highest occupied band
(C) Is the lowest occupied band
(D) Both (A) and (B)✓
(E) Both (A) and (C)

88. Valence band:
(A) May be partially filled
(B) May be completely filled
(C) Can never be empty
(D) Either (A) or (B)
(E) All of these✓

89. Conduction band:
(A) Is above the valence band
(B) May be empty
(C) May be partially filled with electrons
(D) All of these✓
(E) None of these

90. While discussing the electrical conductivity, we consider on y:
(A) Conduction band
(B) Valence band
(C) Both (A) and (B)✓
(D) The bands below the valence band
(E) Both (A) and (D)

91. In the periodic table, semi-conductors belong to:
(A) Third graph
(B) Fourth graph✓
(C) Fifty graph
(D) First group
(E) None of these

92. The outer most electrons in an atom of a semi conductor is:
(A) Two is number
(B) Three in number
(C) Four in number✓
(D) Any of these
(E) None of these

93. In between two consecutive permissible energy bands, there is:
(A) Conduction band (B) Forbidden band✓
(C) Valence band (D) Both (A) and (B)
(E) None of these

94. The electrons occupying the conduction band are known as:
(A) Conductive electrons (B) Free electrons
(C) Both (A) and (B)✓ (D) Valence electrons
(E) Both (A) and (D)

95. An insulator has:
(A) No free electrons
(B) Completely filled valence band
(C) Small energy gap between conduction and valence bands
(D) Both (A) and (B)✓
(E) All of these

96. Those materials in which valence and conduction bands overlap each other are called:
(A) Insulator (B) Conductors✓
(C) Semi conductors (D) Any of above
(E) None of these

97. Partially filled conduction and valence bands with a very narrow forbidden energy gap in between them indicates the:
(A) Conductor (B) Insulator
(C) Semi conductor✓ (D) Copper
(E) Both (A) and (D)

98. At zero kelvin, the semi conductor acts as:
(A) Insulator✓ (B) Semi conductor
(C) Conductor (D) Either (B) or (C)
(E) None of these

99. The vacancy of electron in the valence band:
(A) Is called a hole (B) Behaves like a positive charge
(C) Behaves like a negative charge (D) Both (A) and (B)✓
(E) Both (A) and (C)

100. When a battery is connected to a semi conductor, the current passes through it due to:
(A) Electrons (B) Holes
(C) Both (A) and (B)✓ (D) Photons
(E) Mesons

101. The current passing through a semi conductor is:
(A) Equal to the sum of electronic current and hole current✓
(B) Hole current only
(C) Electronic current only
(D) Equal to the difference of electronic current and hole current
(E) None of these

102. On introducing a small amount of impurity into a pure semi conductor, its electrical behaviour:
(A) Does not change at all (B) Is changed substantially✓
(C) Is changed very little (D) Sometimes (A), sometimes (C)
(E) None of these

103. **Example/s of intrinsic semi conductors is/are:**
(A) Pure silicon
(B) Doped germanium
(C) Pure germanium
(D) Both (A) and (C)✓
(E) Both (A) and (B)

104. **In semi conductor materials, the electrons are bound in their respective outer most shells due to:**
(A) Covalent bonds✓
(B) Ionic bonds
(C) Metallic bonds
(D) Both (B) and (C)
(E) None of these

105. **To form an n-type semi conductor, silicon crystal is doped with:**
(A) Penta valent element
(B) Antimony
(C) Arsenic
(D) Phosphorous
(E) Any of these✓

106. **An example of donor impurity is:**
(A) Indium
(B) Phosphorus✓
(C) Gallium
(D) Boron
(E) All of these

107. **To form a p-type semi conductor, silicon is doped with:**
(A) Germanium
(B) Arsenic
(C) Indium✓
(D) Phosphorous
(E) Antimony

108. **An example of acceptor impurity is:**
(A) Indium✓
(B) Phosphorous
(C) Arsenic
(D) Silicon
(E) Germanium

109. **An n-type semi conductor is:**
(A) Neutral✓
(B) Negatively charged
(C) Positively charged
(D) Sometimes (B), sometimes (C)
(E) None of these

110. **A p-type semi conductor is:**
(A) Positively charged
(B) Neutral✓
(C) Negatively charged
(D) Sometimes (A), sometimes (C)
(E) None of these

111. **Whenever a covalent bond is broken:**
(A) An electron is created
(B) A hole is created
(C) A photon is created
(D) A proton is created
(E) An electron-hole pair is created✓

SUPER CONDUCTORS

112. **The first super conductor was discovered:**
(A) In 1911
(B) By Kmaerlingh Ornes
(C) Prof. Yao
(D) In 1986
(E) Both (A) and (B)✓

113. **The materials which conductivity becomes maximum at certain temperature T_C are called:**
(A) Conductors
(B) Super conductors✓
(C) Semi conductors
(D) Poor conductors

(E) None of these

114. **Super conductors have:**
(A) **Minimum value of resistivity and maximum conductivity✓**
(B) Minimum conductivity and maximum resistivity
(C) Maximum values of both conductivity and resistivity
(D) Minimum values of both conductivity and resistivity
(E) None of these

115. **Aluminium, tin and lead become super conductors within the temperature range of:**
(A) 1.18 K and 7.2 K (B) 77 K and 125 K
(C) 163 K and 293 K (D) Very low temperatures
(E) **Both (A) and (D)✓**

116. **A complex crystalline structure is found to become super conductor at:**
(A) 163 K (B) 125 K
(C) 77 K (D) −110° C
(E) **Either (A) or (D)✓**

117. **The boiling point of liquid nitrogen is:**
(A) **77 K✓** (B) 125 K
(C) −196°C (D) −148°C
(E) Either (B) or (D)

118. **Which metal becomes super conductor within the temperature range of?**
(A) 1.18 K and 7.2 K (B) Aluminium
(C) Zinc (D) **Both (A) and (C)✓**
(E) Uranium

119. **Temperature below which aluminium behaves as super conductor is:**
(A) 4.2 K (B) **1.18 K✓**
(C) 3.72 K (D) 7.2 K
(E) None of these

120. **The super conductors which will be common in use are at:**
(A) **Room temperature✓** (B) 163 K
(C) 125 K (D) 77 K
(E) 4.2 K

121. **Super conductors are used in:**
(A) MRI (B) Magnetic levitation trains
(C) Powerful but small electric motors (D) Faster computer chips
(E) **All of these✓**

MAGNETIC PROPERTIES OF SOLIDS

122. **The magnetism produced by electrons within an atom is due to their:**
(A) Orbital motion (B) Spin motion
(C) Vibratory motion (D) All of these
(E) **Only (A) and (B)✓**

123. **An atom having resultant magnetic field:**
(A) Behaves like a tiny magnet (B) Is called magnetic dipole
(C) Is called diamagnetic (D) Both (A) and (B)
(E) **All of these✓**

124. **Magnetic field produced by spinning nucleus is:**
(A) Much stronger than that of orbiting (B) **Much weaker✓**

electrons
(C) Is the same
(D) Each is true at different times
(E) None of these

125. "All magnetic effects may be due to circulating currents (i.e., moving charges)." This idea belongs initially to:
(A) Ampere✓
(B) Maxwell
(C) Faraday
(D) Tesla
(E) Planck

126. Source of magnetism is:
(A) Electrons✓
(B) Protons
(C) Neutrons
(D) Photons
(E) Mesons

127. Select the wrong statement:
(A) It is impossible to obtain an isolated north pole.
(B) The north pole is merely one side of the current loop.
(C) The north pole and south pole can be separated.
(D) Only (C) is correct.✓
(E) Both (C) and (D) are wrong.

128. The materials whose atoms do not form magnetic dipoles are known as:
(A) Diamagnetic✓
(B) Electromagnetic
(C) Ferromagnetic
(D) Para magnetic
(E) None of these

129. In para magnetic substances, the orbital axes and spin axes of electrons are so oriented that their fields:
(A) Support each other✓
(B) Add up to zero
(C) Add up to maximum
(D) Any of these
(E) None of these

130. An example of ferromagnetic substance is:
(A) Water
(B) Cobalt✓
(C) Bismuth
(D) Antimony
(E) None of these

131. The magnetic substances which are of great interest for electrical engineers are the:
(A) Ferromagnetic substances✓
(B) Diamagnetic substances
(C) Para magnetic substances
(D) Electromagnetic substances
(E) None of these

132. A substance in which the atoms cooperate with each other in such a way so as to exhibit a strong magnetic effect is called:
(A) Para magnetic
(B) Diamagnetic
(C) Ferromagnetic✓
(D) Electromagnetic
(E) None of these

133. Tick the ferromagnetic substance:
(A) Chromium oxide✓
(B) Water
(C) Copper
(D) Bismuth
(E) Antimony

134. Tick the substance which is not ferromagnetic:
(A) Alnico
(B) Copper✓
(C) Cobalt
(D) Nickel
(E) Ferrous

135. Alnico is an alloy of:
(A) Argon, neon, carbon, oxygen
(B) Aluminium, neon, indium, cobalt

(C) **Aluminium, nickel, cobalt✓**
(D) Aluminium, nitrogen, carbon, oxygen
(E) None of these

136. **The term domain refers mainly to:**
(A) **Ferromagnetic substance✓**
(B) Diamagnetic
(C) Para magnetic substance
(D) Electromagnetic substance
(E) None of these

137. **The domains:**
(A) Are small regions
(B) Are of macroscopic size
(C) Contain 10^{12} to 10^{16} atoms
(D) **All of these✓**
(E) None is true

138. **The magnetic domains are of the size of:**
(A) **mm or less✓**
(B) cm or greater
(C) mm or greater
(D) Metres
(E) None of these

139. **One domain contains:**
(A) Zero to 100 atoms
(B) 10^6 to 10^{12} atoms
(C) **10^{12} to 10^{16} atoms✓**
(D) One atom only
(E) Exactly 1000 atoms

140. **A magnetic material:**
(A) Is a permanent magnet
(B) Can be magnetized
(C) Can be demagnetized
(D) **Can either be magnetized or be demagnetized✓**
(E) None of these

141. **Alnico V:**
(A) **Is a hard magnetic material✓**
(B) Is the best for making an electromagnet.
(C) Is an ordinary alloy
(D) Has the domain which cannot retain alignments after the magnetizing field is removed
(E) All are true

142. **Tick the wrong statement about Alnico V:**
(A) It is a special alloy.
(B) **Is a soft magnetic material✓**
(C) Its domains require very strong external fields for the alignment.
(D) It is the best for making a good permanent magnetic.
(E) It retains the alignments when magnetizing field is removed.

143. **The temperature above which the iron becomes para magnetic from ferro magnetic, is called:**
(A) **Curie temperature✓**
(B) Absolute temperature
(C) Kelvin temperature
(D) Room temperature
(E) Melting point

144. **The curie temperature for iron is:**
(A) **750°C✓**
(B) 1023°C
(C) 450°C
(D) 723K
(E) Both (C) and (D)

145. **Curie temperature is:**
(A) Same for iron and cobalt
(B) Different for chromium oxide and cobalt
(C) Different for nickel and cobalt
(D) **Both (B) and (C) ✓**
(E) None of these

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Atomic & Molecular Physics

(1) **The value of Rydberg's constant is:**
(a) $1.0974 \times 10^{-7}\ m^{-1}$ (b) $1.0974 \times 10^{7}\ m^{-1}$✓
(c) $1.0974 \times 10^{4}\ cm^{-1}$ (d) $1.0974 \times 10^{10}\ cm^{-1}$

(2) **Tick the series which lie(s) in the infrared region:**
(a) Pfund series (b) Bracket series
(c) Paschen series (d) All of these✓

(3) **In the general formula for spectral series, if we put p = 2, we get the formula for:**
(a) Lyman series (b) Balmer series✓
(c) Paschen series (d) Pfund series

(4) **An electron of the hydrogen atom in the second orbit is called its:**
(a) Ground state (b) Excited state✓
(c) Ionized state (d) Any of these

(5) **The first series which was identified in the spectrum of hydrogen is called:**
(a) Lyman series (b) Balmer series✓
(c) Paschen series (d) Brackett series

(6) **Balmer series was identified in:**
(a) 1685 (b) 1785
(c) 1885✓ (d) 1985

(7) **Tick the incorrect statement:**
(a) $\lambda_{violet} = 700$ nm✓ (b) $\lambda_{red} = 656$ nm
(c) $\lambda_{blue} = 434$ nm (d) $h = 6.62 \times 10^{-34}$ Js

(8) **The process of formation of spectrum is called:**
(a) Interference (b) Spectroscopy✓
(c) Dispersion (d) Reflection

(9) **The results of spectra obtained by Balmer were expressed in 1896 by:**
(a) Bohr (b) Rydberg✓
(c) Planck (d) Coulomb

(10) **The formula of Brackett series can be obtained by putting in the general formula, the value of n equal to:**
(a) One (b) Two
(c) Three (d) Four✓

(11) **The general formula which includes all the series of hydrogen spectrum is given by:**
(a) $\lambda = \frac{1}{R_H}\left(\frac{1}{p^2} - \frac{1}{n^2}\right)$ (b) $\lambda = \frac{1}{R_H}\left(\frac{1}{n^2} - \frac{1}{p^2}\right)$
(c) $\frac{1}{\lambda} = R_H\left(\frac{1}{p^2} - \frac{1}{n^2}\right)$✓ (d) $\frac{1}{\lambda} = R_H\left(\frac{1}{n^2} - \frac{1}{p^2}\right)$

(12) **Spectrum represents the number of component colours present in certain light in terms of:**
(a) Wavelength (b) Frequency
(c) Energy (d) All of these✓

(13) **Tick the series which lies in the visible region:**
(a) Lyman series (b) Balmer series✓
(c) Paschen series (d) Pfund series

(14) **Atoms of hydrogen gas can be excited by passing electric current through it when the gas is filled into the discharge tube at a pressure which is:**
(a) Less than atmospheric pressure
(b) Much less than atmospheric pressure✓

(c) Greater than atmospheric pressure
(d) Much greater than atmospheric pressure

(15) Balmer series lies in that region of electromagnetic wave spectrum which is called:
(a) Visible region✓ (b) Invisible region
(c) Infra-red region (d) Ultraviolet region

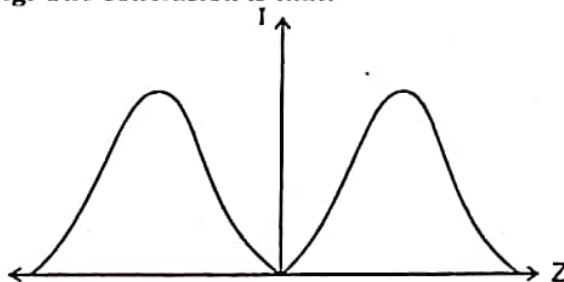
(16) The natural arrangement of colours in the spectrum of white light spectrum is:
(a) Vibgyor✓ (b) Roybgiv
(c) Roybigv (d) Bigroyv

(17) The range of wavelengths of colours in the visible colours is:
(a) 410 nm to 456 nm (b) 10 nm to 56 nm
(c) 410 nm to 656 nm✓ (d) 910 nm to 956 nm

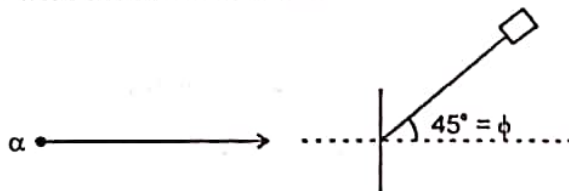
(18) The spectral series found in the infrared region is/are:
(a) Paschen series (b) Brackett series
(c) Pfund series (d) All of these✓

(19) Lyman series in the spectrum of hydrogen exists in the:
(a) Infrared region (b) Visible region
(c) Ultraviolet region✓ (d) None of these

(20) The spectrum emitted from hydrogen filled discharge tube is:
(a) Line spectrum (b) Discrete spectrum
(c) And spectrum (d) Both (a) and (b)✓

(21) The Stern Gerlach experiment in quantum physics demonstrates the quantization spin. Sample data is shown in the fig. The conclusion is that:

(a) The electron is a fermion and can have spin up or down.✓
(b) The electron has no spin.
(c) The electron can only have spin up.
(d) The electron can only have spin down

(22) Consider a simple laboratory experiment where the length and width of a rectangle are measured $\ell = 5.45 \pm 0.5$ cm and $W = 3.86 \pm 0.2$ cm. Find the uncertainty in the area ΔA:
(a) 0.05 cm (b) 0.02 cm
(c) 0.035 cm (d) 0.22 cm✓

(23) In a Rutherford Scattering experiment, 10 MeV α-particles are scattered by a gold foil 0.1 μm thick into a detector whose sensitive area is 10 cm² which is placed 50 cm from the target and makes an angle of 45° with the incident beam.

Calculate the differential cross-section in the center of mass system in barns (b) per steradians (SR). (1 milli barn = 10^{-28} square meters)
(a) 2.65 b/sr (b) 1.04 b/sr
(c) 3.78 b/sr (d) 15.1 b/sr✓

(24) Consider a mechanical model of the proton where the spin is due to its rotation. Assume the proton to be a uniform solid sphere and derive the equatorial velocity (Assume $m_p = 1.67 \times 10^{-24}$ gr, $V_p = 10^{-13}$ cm):
(a) 1.58×10^{10} cm/s (b) 1.58×10^{10} cm/s
(c) 3.00×10^{10} cm/s (d) 7.88×10^{9} cm/s✓

(25) Consider the hydrogen molecule H_2 as a rigid diatomic rotor of separation r = 1.04 A° between two protons. Calculate the energy of the $\ell = 3$ level in the rotational spectrum. ($m_p = 938.280 \times 10^6$ ev/c², h = 1973.5 ev A°/c):
(a) 0.10 ev (b) 0.05 ev✓
(c) 0.15 ev (d) 0.005 ev

(26) According to classical mechanics, the atom will decay in a very short time. Roughly how long does it take for the electron to spiral into the nucleus as it emits electromagnetic radiation?
(a) 10^{-10} s✓ (b) 10^{-11} s
(c) 10^{-12} s (d) 10^{-9} s

(27) The μ-meson has the same charge as the electron, but a greater mass $m_\mu = 207$ m. Use Bohr theory to find the radius of a μ-mesonic atom with nucleus of charge Ze orbited by the μ^- as compared to the radius of the hydrogen-like atom:
(a) $r_\mu = r_H$ (b) $r_\mu = 207\, r_H$
(c) $r_\mu = 207^2\, r_H$ (d) $r_H = r_H/207$✓

(28) X-rays with an energy of 50 KeV undergo Compton scattering from a target. If the scattered rays are detected at 45° relative to the incident rays, find the energy of the scattered x-ray:
(a) 51.4 KeV (b) 47.2 KeV
(c) 48.6 KeV✓ (d) 50.0 KeV

(29) For collisions between identical particles what is the relationship between the CM and the laboratory scattering angles?
(a) $\theta = 2\psi$✓ (b) $\theta = \pi/2 - \psi$
(c) $\theta = \psi$ (d) $\theta = \pi/2 + \psi$

(30) Calculate the speed of a proton of kinetic energy 1 TeV in the Tevatron at Fermilab in Batavia, Illinois (Use a Taylor expansion):
(a) $\beta = 0.9999$ (b) $\beta = 0.9999996$
(c) $\beta = 0.999$ (d) $\beta = 1.0$✓

(31) According to the nuclear shell model, what is the proton configuration for the nuclide 27/13 Al?
(a) $1s^2 2s^2 2p^6 3s^2 3p^1$ (b) $1s^2 2s^2 2p^6 3s^2 3p^2$
(c) $(1s_{1/2})^2 (2p_{3/2})^4 (2p_{1/2})^2 (3d_{6/2})^6$ ✓ (d) $(1s_{1/2})^2 (2p_{3/2})^4 (2p_{1/2})^2 (3d_{5/2})^5$

(32) According to Bose-Einstein statistics, there exists a Bose condensate for collections of bosons. What does this mean?
(a) For $T < T_c$ all particles reside in the ground state✓
(b) As $T \to \alpha$ all particles reside in excited states
(c) Bosons are like fermions
(d) For $T < T_c$ bosons dissolve into quarks and gluons

(33) In the Zeeman effect, the energy of a spectral line is found to be changed in a magnetic field. What is the amount of energy change?
(a) $eB/2m_ec$ (b) $\mu_B B$✓
(c) $\mu_B B/2$ (d) $2\mu_B B$

(34) Consider a quantum mechanical two-particle system for which the wave functions are ψ(1, 2) and ψ(2, 1), what is the symmetric eigenstate of the exchange operator P_{12}?

(a) $\frac{1}{\sqrt{2}}\psi(1,2)\psi(2,1)$ (b) $\psi(2,1)$

(c) $\psi(1,2)$ (d) $\frac{1}{\sqrt{2}}(\psi(1,2)+\psi(2,1))$✓

(35) Consider N non-interacting bosons in an infinite potential box of width a. What is the ground state energy?

(a) $h^4\pi^2N/ma^4$ (b) $h^2\pi^2N/2ma^2$✓

(c) $h^2\pi^2/2ma^2$ (d) $h^2\pi^2/ma^2$

(36) Use the Maxwell velocity distribution to find the ratio of the average speed of an N_2 molecule to the escape speed from the surface of the Earth:

(a) 1.0 (b) 0.056

(c) 0.038✓ (d) 0.44

(37) For the one dimensional harmonic oscillator, the potential energy is $U = 1/2\ Kx^2$ and the ground state wave function is

$$\psi_o = Ce^{-dx^2}$$

Find the constant C. (Note $\left\{\int_{-\infty}^{\infty}\frac{1}{\sqrt{2\pi\sigma}}e\right\}$ $-1/2\ x^2/\sigma^2 = 1$)

(a) $C=(2a/\pi)^{1/4}$✓ (b) $C=\sqrt{a/\pi}$

(c) $C=a$ (d) $C=\sqrt{2a/\pi}$

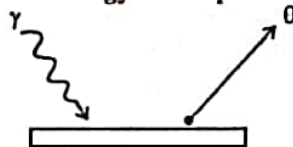
(38) Consider the scattering of two identical fermions, for example proton-proton scattering. If the two particles are in a spin-singlet state, then how does the differential cross-section relate to the scattering amplitude?

(a) $d\sigma/d\Omega = |f(\theta)|^2 + |f(\pi-\theta)|^2$ (b) $d\sigma/d\Omega = |f(\theta)|^2 + f(\pi-\theta)|^2$✓

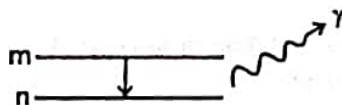
(c) $d\sigma/d\Omega = |f(\theta) - f(\pi-\theta)|^2$ (d) $d\sigma/d\Omega = |f(\theta)|^2 - |f(\pi-\theta)|^2$

(39) In the photoelectric effect, the threshold wavelength is 2756 A°, if light of wavelength 1700 A° is incident on a metal substance, determine the kinetic energy of the photoelectrons:

(a) 4.50 ev
(b) 2.25 ev
(c) 2.79 ev✓
(d) 7.29 ev

γ 0

(40) Atomic spectroscopy relates the wavelengths of the observed spectral lines of a substance to a mathematical formula. Given the Rydberg constant for hydrogen $R = 109,677.6\ cm^{-1}$, find the lower limit for the Paschen series:

(a) 912 A°
(b) 2280 nm
(c) 8206 A°✓
(d) 1460 nm

m n γ

(41) Determine the average energy for a photon gas at temperature $T = 1/KB$ where the energy levels are given by $E_j = jh\omega$, $j = 0, 1, 2, ...$

(a) KT (b) $h\omega/(e^{h\omega\beta}-1)$✓

(c) 3/2 KT (d) 2 KT

(42) Consider the hydrogen-like atom eigen value problem, one electron orbits a nucleus of charge Ze. The general wave function is:

$$\psi_{n/m\ell}(\partial,\theta,\phi) = R_{nl}(r)\lambda_{\ell m\ell}(\theta,\phi)$$

Determine the value of r where the radial probability is a maximum for the ground state.

(a) a_o (b) a_o/z✓

(c) $a_o/3z$ (d) $a_o/2z$

(43) The n = 2 and l = 1 hydrogen-like atom radal wave function is

$R_{21}(r) = Nre^{-zr/2a}$

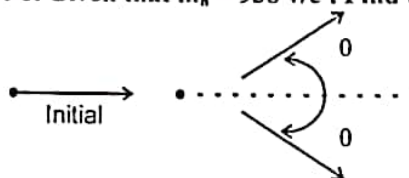
What is the correct normalization factor N?

(a) $(z/2a_o)^{3/2} z/\sqrt{3a}$ ✓ (b) $(z/2a_o)^3$

(c) $z/\sqrt{3a_o}$ (d) $(z/2a_o)^3 z^2/3 a_o^2$

(44) Which of the following is NOT a true statement about the Bohr theory of the hydrogen-like atom with nuclear charge Ze and reduced mass μ?
n is the principal quantum number and/is the angular momentum quantum number.
(a) The energy eigenvalue depends on $l(l + 1)$✓
(b) The energy eigenvalue is proportional to μ
(c) The energy eigenvalue is proportional to $1/n^2$
(d) The radius of the electron orbit is proportional to n^2

(45) Which of the following is a true statement about the nuclear binding energy in the semi-empirical mass formula model?
(a) The symmetry team is proportional to $(A - 2Z)^2/A$✓
(b) The volume term is proportional to A^2
(c) The coulomb term is proportional to $A^{-2/3}$
(d) The area term is proportional to $A^{1/3}$

(46) A neutron of kinetic energy T = 1876 MeV is incident on a neutron at rest. The neutron scatters elastically at angle θ. Given that $m_n = 938$ v/c². Find θ:

(a) 45.0° (b) 35.3°✓
(c) 70.6° (d) 50.0°

(47) One must use the de-broglie wavelength concept to "derive" the Schrodinger equation from the one dimensional wave equation. What de-broglie wavelength must be used to get the general time independent equation?

(a) $\lambda = h/\sqrt{2m(E-U)}$ ✓ (b) $\lambda = h/\sqrt{2mE}$

(c) $\lambda = h/\sqrt{2m(E+U)}$ (d) $\lambda = h/\sqrt{m(E-U)}$

(48) In the 3D harmonic oscillator version of the nuclear shell model, what are the nuclear magic numbers?
(a) 4, 16, 40✓ (b) 4, 12, 24
(c) 1, 4, 9 (d) 1, 4, 16

(49) Use the Mayer and Jensen nuclear shell model with spin-orbit interaction to figure out the spin of the $^{17}_{8}O$ nuclide:
(a) 7/2 (b) 5/2✓
(c) ½ (d) 3/2

(50) In the Zeeman effect, it is found that a sample of Na placed in a magnetic field B has its spectral D line split into three lines. Find the amount of the shift δω, in cgs units, where ω is the angular frequency of the spectral line:
(a) $\delta\omega = \pm eB/8m$, c (b) $\delta\omega = \pm eB/4m$, c
(c) $\delta\omega = \pm eB/3m$, c (d) $\delta\omega = \pm eB/2m$, c✓

(51) In the photoelectric effect, electromagnetic radiation is incident upon the surface of a metal. Which of the following is not a true statement about the photoelectric effect?
(a) There is no photocurrent unless $V > V_o$.
(b) V_o is characteristic of the cathode material.

(c) Above the threshold frequency, the flux of electrons per second increases as the intensity of incident light.

(d) The stopping potential V_o is proportional to V^2.✓

(52) Photoelectrons are found to be ejected from a metal surface when the wavelength of incident light is below 2300 A°. If the wavelength of incident photons is 1500 A, then what must be the stopping potential V_o to stop the photoelectrons?

(a) 8.27 V (b) 5.39 V
(c) 2.88 V✓ (d) 1.56 V

(53) X-rays of wavelength 1.50A° are scattered by a metal through an angle of 90°. What is the kinetic energy of the recoil electrons?

(a) 132 eV✓ (b) 264 eV
(c) 822 eV (d) 736 eV

(54) In a laboratory experiment, two quantities x and y are measured. Then the formula:

$$f = c\sqrt{x/y}$$

is used to calculate a third quantity f. If Δx and Δy are the uncertainties in x and y, respectively, then what is the uncertainty in f?

(a) $\Delta f = f/2\sqrt{(\Delta x/x)^2 + (\Delta y/y)^2}$ ✓ (b) $\Delta f = \sqrt{(\Delta x)^2 + (\Delta y)^2}$
(c) $\Delta f = f\sqrt{(\Delta x/x^2) + (\Delta y/y)^2}$ (d) $\Delta f = f\sqrt{(\Delta x/x)^2 + (\Delta y/zy)^2}$

(55) Consider a one dimensional harmonic oscillator of energy

$$E = p^2/2m + bx^4$$

Find the mean total energy of this oscillator at a temperature T.

(a) 1/2 KT (b) 3/4 KT✓
(c) 7/4 KT (d) 3/2 KT

(56) AK_α x-ray emitted by one hydrogen atom strikes a second hydrogen atom and undergoes photoelectric absorption with an L shell electron. What energy does the effected electron have?

(a) 6.8 eV✓ (b) 13.6 eV
(c) 10.2 eV (d) 3.4 eV

(57) Consider that the energy of an incident photon becomes very large. The photon is then scattered by an electron as shown here in the initial state. Find the energy of the Compton scattered photon in this limit:

(a) E (b) $1/2m_oC^2$✓
(c) $E/2 + 1/2\ m_pC^2$ (d) E/2

(58) Each of the hydrogen atom quantum mechanical wave functions has a characteristic symmetry. In the below 3D picture where we have plotted $\psi\psi^*(y = 0)$, what is the quantum state?

(a) ψ_{100} (b) ψ_{321}✓
(c) ψ_{300} (d) ψ_{200}

(59) The first excited state of the one dimensional harmonic oscillator has eigenfunction:

$$\phi(x) = Nxe^{-\alpha^2x^2/2}$$

Find N:

(a) $(\alpha^2/\pi)^{1/4}$ (b) α/π
(c) $\sqrt{2\alpha^3/\sqrt{\pi}}$ ✓ (d) $2\alpha^3/\sqrt{\pi}$

(60) Which of the following is not a true statement about nucleons?

(a) Protons and neutrons are fermions.
(b) Even z even n nucleus have zero total angular momentum.
(c) The total angular momentum is integral for nuclei with even A.
(d) Protons and neutrons have integer spin.✓

(61) Which of the following is not a true statement about the Roman effect? Let $\hbar\omega$ be the incident light energy:
(a) A quantum of monochromatic light is scattered in elastically.
(b) A quantum of monochromatic light is scattered elastically.✓
(c) Energy $\hbar\omega$ is exchanged with a molecule.
(d) Roman scattering occurs as a result of the induced dipole moment.

(62) A plan wave solution of Maxwell's equations in free space is $E = yE_{oy}\cos(\omega t - Kx + \alpha) + ZE_{oz}\cos(\omega t - Kx + \beta)$
Let $\delta = \beta - \alpha$ be the phase difference. Under what conditions do we get elliptic polarization?
(a) $\delta = \pm\pi/2$✓
(b) $\delta = \pm\pi$
(c) $\delta = 0$
(d) $\delta =$ and $E_{oy} = E_{oz}$

(63) Determine the speed of the photoelectrons ejected from a metal surface. The threshold wavelength is 2638 A° and the wavelength of incident light is 160 A°:
(a) 5.2×10^5 m/s
(b) 1.04×10^6 m/s✓
(c) 2.08×10^6 m/s
(d) 2.6×10^5 m/s

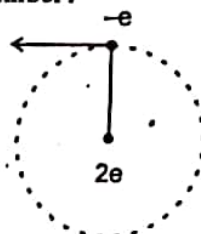
(64) Electromagnetic radiation of wavelength 6.20 A° is incident on a substance and back-scattered at an angle of 180°. Determine the Compton energy shift of the EM waves:
(a) 15.5 eV✓
(b) 2.0 KeV
(c) 4.0 KeV
(d) 1.0 KeV

(65) An ideal system of N spins each of magnetic moment μ, is under consideration. Each spin can either point up or down only. Where P(1) = P and P(↓) = q = 1 − P. Find the variance of the mean magnetic moment:
(a) $NPq\mu_o^2$
(b) $8NPq\mu_o^2$✓
(c) $4NPq\mu_o^2$
(d) $6NPq\mu_o^2$

(66) Consider the spectroscopy of the hydrogen atom in Bohr theory. Determine the upper limit for the Brckett series. Given that $R = 109{,}677.6\ cm^{-1}$.
(a) 4050 nm✓
(b) 1216 A°
(c) 1880 nm
(d) 7450 nm

(67) A ball bounces elastically in the vertical y direction. Calculate the energy levels using Bohr-Summerfield quantization:

(a) nghm
(b) $(9n^2\pi^2g^2h^2m)^{2n}$
(c) $(9n^2\pi^2g^2h^2m/8)^{1/3}$✓
(d) $(9n^2\pi^2g^2h^2m/8)^{2/3}$

(68) What is the degeneracy of the energy for a hydrogen like atom with principal quantum number n and orbital quantum number?

(a) n
(b) n^2✓
(c) 21 + 1
(d) 1(1 + 1)

(69) In the quantum theory approach to the hydrogen-like atom for 1 = 0 using the Schrodinger equation, find the energy eigenvalue for the ground state radial wavefunction:

$$R_{10}(r) = Ne^{-r/100}$$

(a) $-K^2Z^2\mu e^4/2h^2$✓ (b) $K^2Z^2\mu e^4/2h^2$
(c) $K^2Ze^4/2\mu\eta h$ (d) $-K^2Z\mu e^4/2h^2$

(70) The complete wavefunction for a particular state of a hydrogen-like atom is

$$\psi(r,\theta,\phi = Nr^2e^{-zr/30}\sin^2\theta e^{2i\phi})$$

Determine the eigenvalue of the angular momentum operator L:

(a) h (b) **2h**✓
(c) h (d) 3h

(71) Study the coupled harmonic oscillator problem pictured below. Find the anti-symmetric mode frequency:

(a) $\sqrt{k/m}$ (b) $\sqrt{k/m}$
(c) $\sqrt{(k+2k)\ /m}$✓ (d) $\sqrt{(k+k)/m}$

(72) The fact, "A metallic surface can emit electricity when light of very short wavelength falls on it", was discovered by:

(a) **Hertz**✓ (b) Coulomb
(c) Moseley (d) Heisenberg

(73) In ________, Einstein proposed a mechanism for the photoelectric effect, based on Planck's idea of quanta of energy.

(a) 1904 (b) **1905**✓
(c) 1906 (d) 1907

(74) The photoelectric equation deduced by the Einstein is:

(a) $\frac{1}{2}mv^2 = hv \times A$ (b) $\frac{1}{2}mv^2 = hv + A$
(c) $\frac{1}{2}mv^2 = hv - A$✓ (d) $\frac{1}{2}mv^2 = hv/A$

(75) In photoelectric effect, the energy of the electrons:

(a) Varies linearly with the frequency.
(b) Its independent of the intensity.
(c) Is dependent of the intensity.
(d) **Both (a) and (b)**✓

(76) In photoelectric effect, the number of electrons ejected is:

(a) **Proportional to the number of incident light quanta**✓
(b) Inversely proportional to the number of incident light quanta.
(c) Both (a) and (b)
(d) None of these

(77) Einstein's photoelectric law has also been found to be valid for the electrons ejected by:

(a) x-rays only (b) γ-rays only
(c) α-rays only (d) **Both (a) and (b)**✓

(78) The Compton equation is:

(a) $\Delta\lambda = (2h/m_oC)\sin^2 1/2\phi$✓ (b) $\Delta\lambda = (3h/m_oC)\sin^2 1/2\phi$
(c) $\Delta\lambda = (2h/m_oC)\sin^2 1/2\phi$ (d) $\Delta\lambda = (3h/m_oC)\sin^2 1/2\phi$

(79) In the Compton equation, the quantity h/m_oC is known as:

(a) Compton coefficient (b) **Compton wavelength**✓
(c) Compton variable (d) Compton constant

(80) Compton scattering is called because:

(a) Most electrons is matter are effectively free
(b) Electrons are at rest in matter
(c) **Most electrons in matter are effectively free and at rest.**✓
(d) None of these

(81) In the atom Na, the two levels $2p_{3/2}$ and $2p_{1/2}$ are separated by 5.97 Å in wavelength. Transition from these levels involves the emission of light of wavelengths $\lambda_1 = 5889.95$ Å and $\lambda_2 = 5895.92$ Å. Calculate the value of the constant in the expression for the spin-orbit coupling:
(a) 0.001 eV (b) 0.0001 eV
(c) 0.1 eV (d) 0.01 eV

(82) X-rays of wavelength 3.00 Å are incident on a substance. The scattered X-rays observed at 45.0° have a different wavelength due to the Compton effect. Find the scattered wavelength:
(a) 2.93 Å (b) 3.07 Å✓
(c) 2.98 Å (d) 3.01 Å

(83) Each hydrogenic spectral series has an upper and a lower limit. Which of the following spectral series has an upper limit λ = 18.760 Å?
(a) Paschen series✓ (b) Balmer series
(c) Brackett series (d) Lyman series

(84) In the Thomson model of the atom. The electrons are distributed as plum through a positive atomic pudding. What single wavelength of light would a Thomson hydrogen atom emit?
(a) 1184 Å✓ (b) 4740 Å
(c) 7100 Å (d) 2370 Å

(86) Two particles of mass m move in a 3-dimensional cubical box of side a if the particles also repel ch other via a weak short range force $v(r_1 - r_2) = v_o\, \delta^3(r_1 - r_2)$, then calculate the ground state energy using perturbation theory:
(a) $h^2\pi^2/ma^2$ (b) $3h^2\pi^2/ma^2 + (3/2a)^3 v_o$✓
(c) $(3/2a)^3\, v_o$ (d) $3h^2\pi^2/ma^2$

(87) An atom has three valence electrons in a p shell. Determine the total number of states in this configuration. That is, how many distinct three electron states can be constructed from the orbits in a p-shell?
(a) 4 (b) 3✓
(c) 20 (d) 12

(88) Use the nuclear shell model to determine the ground state spin of $^{67}_{30}Zn$:
(a) 5/2 (b) ½
(c) 0✓ (d) 3/2

****

Explanatory Answer

(1) (b)
(2) (d)
(3) (b)
(4) (b)
(5) (b)
(6) (c)
(7) (a)
(8) (b)
(9) (b)
(10) (d)
(11) (c)
(12) (d)
(13) (b)
(14) (b)
(15) (a)
(16) (a)
(17) (c)
(18) (d)

(19) (c)
(20) (d)
(21) (a)
The two peaks in the intensity versus Z plot verify the quantization of spin. The force exerted upon the electron in the atom is given by:

$$F_2 = \mu_2 \frac{\partial B_2}{\partial_z}$$

Since

$$\mu_2 = \pm\frac{1}{2}\mu_B \text{, there are two peaks.}$$

(22) (d)
From the theory of propagation of error:

$$A = I\omega$$

$$\Delta A = \sqrt{\left(\frac{\partial A}{\partial I}\Delta I\right)^2 + \left(\frac{\partial A}{\partial W}\Delta w\right)^2}$$

$$= \sqrt{(w\Delta I)^2 + (I\Delta w)^2}$$

$$= IW\sqrt{\left(\frac{\Delta I}{\ell}\right) + \left(\frac{\Delta w}{w}\right)^2}$$

$$= (5.45)(3.86)\sqrt{\left(\frac{.05}{4.35}\right)^2 + \left(\frac{.02}{3.86}\right)^2}$$

$$= 0.22 \text{ cm}$$

(23) (d)

$$\frac{d\sigma}{d\Omega} = \left(\frac{K}{4T_o}\right)^2\left(\sin\left(\frac{\theta}{2}\right)\right)^{-4}$$

$$K = \frac{1}{4\pi\varepsilon_o} Z_1 Z_2 e^2$$

T_o' is kinetic energy in C.M. System
T_o is kinetic energy in Lab System
θ is angle in C.M. System
ψ is angle in Lab System
Given $\psi = 45°$ and $T_o = 10$ MeV
Since the mass of an α-particle is much smaller than the mass of a gold nucleus,

$$\psi = \theta \quad \text{and} \quad t_o = t'_o$$

$$\frac{d\sigma}{d\Omega} = \left(\frac{K}{4T_o}\right)^2\left(\sin\left(\frac{\psi}{2}\right)\right)^{-4}$$

$$= \left(\frac{79(2)(1.44)}{4(1)}\right)^2 \sin^{-4}(22.5°)$$

$$= 1,509\frac{Fm^2}{Sr} \times \frac{10mb}{1fm^2}$$

$$= 15,090\frac{mb}{sr}$$

$$= 15.09\frac{b}{sr}$$

(24) (d)

The moment of inertia of a sphere is

$$I = \frac{2}{5}mr^2$$

Hence,

$$L = I\omega = \frac{2}{5}mr^2\omega$$

But also

$$S = \frac{1}{2}h$$

Since the proton is a fermion

$$\frac{2}{5}mr^2\omega = \frac{1}{2}h$$

$$v = r\omega$$

$$= \frac{1}{2}h\frac{5}{2}\frac{1}{mr}$$

$$= \frac{5}{4}\frac{h}{mr}$$

$$= \frac{5}{4}(1.055\times10^{-27})/(1.673\times10^{-24})(10^{-13})$$

$$= 7.88 \times 10^9 \text{ cm/s}$$

(25) (b)

The rotational energy eigenvalue is $E_l = h^2\ell(\ell + 1)/2\mu r^2$

where is the angular momentum quantum number and r is the relative distance.

$$h = 1973.5 \text{ eV} - \text{Å/C}$$

$$m_p = 938.280 \times 10_l^6 \text{ eV/C}^2 = m_1 = m_2$$

The reduced mass is

$$\mu = m_1m_2/(m_1 + m_2)$$

$$= m_r/2 = 469.140 \times 10^6 \text{ ev/c}^2$$

$$E_3 = (1973.5)^2 3(4)/2(469.140 \times 10^6)(1)^2$$

$$= 0.05 \text{ eV}$$

(26) (a)

Larmor's formula states that an electron circling a nucleus. With centripetal acceleration a emits energy with rate

$$P = \frac{1}{4\pi\varepsilon_o}\frac{2}{3}.\frac{c^2a^2}{c^3} = \frac{du}{dt}$$

From this it may be shown that the electron will spiral into the nucleus in about 10^{-10} s.

(27) (d)

Using F = ma with a v^2/r as the centripetal acceleration and $F = Kq_1q_2q/r^2$ as the Coulomb force, we have

$$F = \frac{mv^2}{r} = \frac{KZe^2}{r^2}$$

From Bohr theory

$$L = mvr = nh$$

Thus

$$V = \frac{nh}{mr}$$

$$\frac{m\left(\frac{nh}{mr}\right)^2}{r} = \frac{KZe^2}{r^2}$$

$$r_\mu = \frac{n^2h^2}{KZe^2m_\mu}$$

$$r_\mu = \frac{n^2h^2}{KZe^2m_e}$$

$$r_\mu = \frac{m_e}{m_\mu}r_H = \frac{1}{207}r_H$$

where r_H is the radius of the Hydrogen-like atom in Bohr theory.

(28) (c)
The Compton shift is

$$\Delta\lambda = \lambda - \lambda$$

$$\lambda - \lambda = \lambda_c(i - \cos\theta)$$

where

$$\lambda_c = hc/m_ic^2$$

is the Compton wavelength

$$= 12.400/511.000$$

$$= .02426 \text{ Å}$$

$$E = 50 \times 10^3 \text{ eV} = hc/\lambda$$

$$\lambda = hc/E = 12{,}400/50{,}000 = 0.2480 \text{ Å}$$

$$\lambda' = \lambda + \Delta\lambda = .2480 \text{ Å} + .02426 \text{ Å}\left(1 - \frac{1}{\sqrt{2}}\right)$$

$$= .2551 \text{ Å}$$

$$E' = hc\lambda'$$

Thus

$$E' = hc/\lambda'$$

$$= 12{,}400/.2551$$

$$= 48.6 \text{ KeV}$$

Is the scattered photon energy. Note that the photon loses energy to the electron.

(29) (a)
Consider the initial and final states in the two frames:

Now

$$\mu_1 = V_1/2$$

Now

$$\mu_1 = V_1/2 = V_1 - V_1/2$$

Hence,

$$u_1 = V_1 - V_1/2$$

as in the below figure

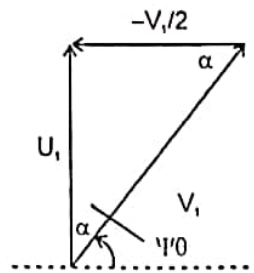
$$\theta = \psi + \alpha$$

By geometry and also

$$\alpha = \psi$$

$$\therefore \quad \theta = 2\psi$$

Since

$|u_t| = \frac{V_1}{2}$ making the triangle isosceles.

(30) (d)

The Mossbauer effect is the recoilless resonance emission/absorption of nuclear radiation. For the ^{57}Fe case.

$$E_o = 14.4 \text{ KeV}$$
$$t = 9.8 \times 10^{-8} \text{ s}$$

is given.

The energy width is

$$\Gamma = h/t = (1.055 \times 10^{-27})/(9.8 \times 10^{-8})(1.602 \times 10^{-12} \text{ erg/eV})$$
$$= 6.72 \times 10^{-9} \text{ eV}$$

One destroys resonant absorption in the lattice via the Doppler shift..

$$\Delta E \geq \Gamma . \frac{V}{C} E_o \geq T$$

$$V \geq \Gamma_C / E_o = \frac{(6.72 \times 10^{-9})(2.998 \times 10^{10})}{1.44 \times 10^{3}}$$

$$V_{min} = 0.014 \text{ cm/s}$$

(31) (c)

The proton configuration is

$$(1s_{1/2}) : (1p_{3/2})^4 (1p_{1/2})^2 (1d_{5/2})^5$$

Since

there are 13 protons while the neutron configuration is

$$(1s_{1/2})^2 (1P_{3/2})^4 (1P_{1/2})^2 (1d_{5/2})^6$$

Since, there are 14 neutrons. Only the open proton shell contributes to the nuclear spin. Hence, the spin of the $^{27}_{13}Al$ nuclide may also be deduced to be $j = 5/2$.

(32) (a)

The Bose condensation phenomenon occurs for low temperatures T less than a critical temperature T_c where all particles reside in the lowest state.

(33) (b)

In the Zeeman effect, the frequency is shifted by an angular frequency

$$\Delta\omega = \pm eB/2m_e c$$
$$= \pm \mu_B B/h$$

Thus, the energy shift is

$$\Delta E = h\Delta\omega$$
$$= \pm \mu_B B$$

(34) (d)

By definition of the exchange operator

$$P_{12}\psi(1, 2) = \psi(2, 1)$$

$$\psi^s(1, 2) = \frac{1}{\sqrt{2}}(\psi(1,2) + \psi(2,1))$$

Then

$$P_{12}\psi^3(1,2) = (1)\psi^3(1,2)$$

Or

$$P_{12}\psi^3(1,2) = \frac{1}{\sqrt{2}}(\psi(1,2)+\psi(2,1))$$

(35) (b)
The potential energy function is

$$V(x) = \begin{cases} \infty x < -a/2 \\ 0 - a/2 < x < a/2 \\ \infty x > a/2 \end{cases}$$

The Schrodinger equation

$$H\psi_n = E\psi_n$$

With Hamiltonian $H = T + U$ has eigen values given by

$$\psi_n(x) = \cos(n\pi x(a))$$

Since

$$\frac{-h}{2m}\frac{d^2\psi_m}{dx^2} = \frac{h^2n^2\pi^2}{2ma^2}\psi_n$$

$$E_n = nE = \frac{h^2\pi^2}{2ma^2}n^2$$

For a single boson. In the ground state, $n = 1$. For N such bosons $E_t = NE$

(36) (c)
One may find $< v >$ from

$$\frac{\int v \int(v)dv}{\int f(v)dv}$$

Using the Maxwell-Boltzmann distribution of (V).

$$< V > = \sqrt{\frac{2KT}{m}}$$

$$= \sqrt{2(1.381\times10^{-16})(300)/(28/6.022\times10^{23})}$$

$$= 4.22 \times 10^4 \text{ cm/s}$$

The escape speed from the surface of the earth is equal to the velocity of a particle whose kinetic energy is equal to its gravitational potential energy at the surface of the earth. Hence

$$\frac{1}{2}mv^2 = \frac{GMm}{R}$$

$$V = \sqrt{2GM/R}$$

$$= \sqrt{\frac{2(6.672\times10)^{-8}(5.98\times10^{27})}{6.38\times10^8}}$$

$$= 1.12 \times 10^6 \text{ cm/s}$$

Thus

$< V > = .038$ which explains the large presence of N_2 in the atmosphere.

(37) (a)

$$U = \frac{1}{2}Kx^2, \psi_o = Ce^{-a^2x^2}$$

are given

$$\int_{-\infty}^{\infty}\psi_o\psi_o\,dx = 1$$

by the normalization condition

$$\int_{-\infty}^{\infty} C^2 e^{-2ax^2} dx = 1$$

Now, we know that

$$\int_{-\infty}^{\infty} \frac{1}{\sqrt{2\pi\sigma}} e^{-\frac{1}{2}\frac{x^2}{\sigma^2}} = 1$$

Using the standard Gaussian probability density function. Thus

$$\int_{-\infty}^{\infty} \frac{1}{2\pi\sqrt{1/4a}} e^{-1}{}_{1/y_a} dx = 1$$

Hence,

$$C^2 = \frac{1}{\sqrt{2\pi}} 2\sqrt{a} = \sqrt{2a/\pi}$$

$$C = (2a/\pi)^{1/4}$$

(38) (b)

If the two particles are in spin singlet state, then the spatial wave function is symmetric. Thus

$$\frac{d\sigma}{d\Omega} = |f(\theta) + f(\pi - \theta)|^2$$

(39) (c)

The work function is

$$\phi = hv_o = hc/\lambda_o$$
$$= 12{,}400/2576 = 4.50 \text{ eV}$$

and hence

Cu is the substance. The light energy is

$$E = hv = hc/\lambda$$
$$= 12{,}400/1700 = 7.29 \text{ eV}$$

By conservation of energy

$$t + \phi = hv$$

Thus the kinetic energy of the photoelectrons is

$$T = hv - \phi$$
$$= 2.79 \text{ eV}$$

(40) (c)

$$R = 109{,}677.6 \text{ cm}^{-1}$$

is given as the Rydberg constant for hydrogen. The Lyman, Balmer, Paschen, Brackett, and Pfund series result from electronic transitions from level m ton = 1, 2, 3, 4, 5 respectively. For the Paschen series n = 3 and so

$$\frac{1}{\lambda} = R\left(\frac{1}{n^2} - \frac{1}{m^2}\right)$$
$$= R\left(\frac{1}{9} - \frac{1}{m^2}\right)$$

Clearly $m \to \infty$ gives $\lambda = 8206$ Å the lower limit $m = 4$ gives the upper limit $\lambda = 18{,}760$ Å.

(41) (b)

It is desired to find the average energy for a photon gas, i.e., black body radiation. Proceed using Boltzmann factors:

$$E_j = jhw, j = 0, 1, 2, \ldots\ldots \infty$$
$$\langle E \rangle = \Sigma E_{j_e}{}^{-\beta E} j / \Sigma e^{-\beta E} j$$
$$= h\omega \Sigma j e^{-jx} / \Sigma e^{-jx}, x = h\omega\beta$$
$$= h\omega \Sigma_j y^j / \Sigma y^j, yme^{-x}$$
$$= h\omega(y/(1-y^2)/(1/1-y))$$

$$= h\omega/(e^{h\omega\beta} - 1)$$

We have used the infinite geometric series results

$$1 + y + y^2 + \ldots\ldots = 1/(1 - y)$$

and

$$y(1 + 2y + 3y^2 + \ldots) = y\frac{d}{dy}(1-y)^{-1} = \frac{y}{(1-y)^2}$$

(42) (b)

The hydrogen radial wave functions come from the associated Laguerre polynomials. The ground state wave-function is found from the quantum numbers n = 1, l = 0, $m_l = 0$.

$$R_{10}(Y) = Ne^{-Zr/a_0} = 2\left(\frac{2}{a_0}\right)^{3/2} e^{-2r/a_0}$$

The radial probability density is $P(r) = RR^* r^2$ and this peaks where

$$\frac{d}{dr}(r^2 e^{-2Zr/a_0}) = 0$$

$$2re^{-2Zr/a_0} - r^2 \frac{2Z}{a_0} e - 2Zr/a_0 = 0$$

$$r^2 = \frac{2Z}{a_0} = 2r$$

$$r = \frac{2Z}{a_0} = 2$$

Finally

$$r = \frac{a_0}{Z}$$

One may also show that

$$\frac{d^2p}{dr^2} < 0 \text{ at } \frac{d_0}{Z}$$

Proving that the extremum is a maximum.

(43) (a)

Then n = 2 and l = 1 radial wave function is under consideration.

$$R_{21}(r) = Nre^{-Zr/2a_0}$$

Use the normalization condition

$$\int RR^* r^2 dr = 1$$

$$= N^2 \int_0^\infty r^4 e^{-Zr/a_0} dr$$

$$= N^2 \int_0^\infty r^{5-1} e^{-Ar/a_0} dr$$

$$= N^2 I(5)/(Z/a_0)^5$$

$$= N^2 4! \times a_0^5 / Z^5$$

Thus

$$N^2 = \frac{Z^3}{8a_0^3}\frac{Z^2}{3a_0^2}$$

$$= N = \left(\frac{Z}{2a_0}\right)^{3/2} \frac{Z}{\sqrt{3}a_0}$$

(44) (a)

The hydrogen-like atom energy is a function of Z, μ, and n

$$E_n = -K^2Z^2\mu e^4/2h^2n^2$$

$$= -\frac{Z^2}{n^2}\frac{\mu}{m_e}13.6\ eV$$

This is most easily derived from Bohr theory

$$\left.\begin{array}{l} F = \frac{\mu v^2}{r} = \frac{KZe^2}{r^2} \\ L = \mu vr = n\hbar \end{array}\right\} \Rightarrow r = n^2 a_o/Z$$

With the Bohr radius as $a_o = \hbar^2/\mu ke^2$

Then

$$E = T + U = \frac{1}{2}\mu v^2 - \frac{KZe^2}{r}$$

$$= \frac{-KZe^2}{2r}$$

$$= \frac{-KZe^2}{2}\frac{Z}{n^2}\frac{\mu ke^2}{\hbar^2}$$

$$= \frac{-K^2Z^2\mu e^4}{2\hbar^2n^2}$$

(45) (a)

Experimentally, the nuclear binding energy is

$$BE = 931.50\ A_{el} - 938.28\ Z - 939.57\ N$$

Neglecting the electron masses

According to the semi-empirical mass formula

We get

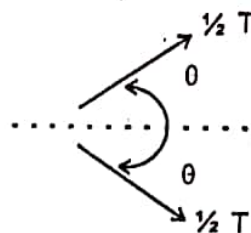
$$BE = C_vA + C_cZ(Z-1)A^{-1/3} + C_AA^{2/3} + C_s\frac{(A-2Z)^2}{A}$$

With parameters

$$C_v = 15.6\ MeV,\ C_c = 0.7\ MeV$$
$$C_A = 17.2\ MeV,\ C_s = 23.3\ MeV$$

(46) (b)

The initial picture is

and the final situation is

By symmetry, the kinetic energy is evenly split after the collision. Now

$$E = T + m$$

and

$$P = \sqrt{E^2 - m^2}$$

Give

$$P^2 = T^2 + 2mT$$

Similarly

$$E' = \frac{1}{2}T + m$$

and

$$P' = \sqrt{E'^2 - m^2}$$

Yield $\quad P'^2 = T^2/4 + mT$

By conservation of momentum P =

$$2P' \cos\theta \text{ or}$$

$$\cos\theta = \sqrt{T^2 + 2mT}/\sqrt{T^2 + 4mT}$$

Plug in m = 938 MeV and T = 1876 MeV = 2 m to get θ = A cos (2/3) = 35.5 ⇒ 2θ = 70.6.

(47) (b)

The hydrogen-like atom wave functions have the following functional dependence

$$\psi_{100} \propto r \sin\theta \text{ e-c}\phi\, e^{-Zr/\infty}$$
$$\psi_{200} \propto r \sin\theta \text{ e-c}\phi\, e^{-Zr/200}$$
$$\psi_{210} \propto r \sin\theta \text{ e-c}\phi\, e^{-Zr/200}$$
$$\psi_{211} \propto r \sin\theta \text{ e-c}\phi\, e^{-Zr/200}$$
$$\psi_{21-1} \propto r \sin 0 \text{ e-c}\phi\, e^{-Zr/200}$$

The orbital shown, plotted in 3D at y = 0, is that of the 210 state

$$P(x, Z) = \psi\psi^* \ (y = 0)$$

(48) (a)

In order to get from the usual wave equation to the Schrodinger equation, one uses the de-broglie wavelength concept

$$\lambda = \frac{h}{p} = \frac{h}{\sqrt{2m(E-U)}}$$

Start with the 1-D wave equation

$$\frac{\partial^2\psi}{\partial x^2} = \frac{1}{V^2}\frac{\partial^2\psi}{\partial t^2}, \psi(x,t) = \phi(x)e^{-i<\alpha}$$

Separating variables

$$\frac{d^2\phi}{dx^2} + \frac{\omega^2}{v^2}\phi(x) = 0$$

Where

$$\omega^2 = 4\pi v^2 = 4\pi^2 v^2/\lambda^2 = 4\pi^2 2m(E-U)v^2/h^2$$

Substituting

$$\frac{d^2\phi}{dx^2} + 2m\frac{(F-U)}{h^2}\phi(x) = 0$$

Rearranging

$$\frac{-h^2}{2m}\frac{d^2\phi}{dx^2} + U\phi = E\phi$$

or

Finally $\quad H\phi = E\phi$ in operator form.

(49) (a)

The 3-D harmonic oscillator can be used to develop a basic nuclear shell model. Use the Schrodinger equation

$$H\psi = E\psi$$

$$\frac{-h^2}{2m}\nabla^2\psi + U\psi = E\psi$$

With potential energy $U = 1/2\ Kr^2$

Because

$$r^2 = x^2 + y^2 + z^2$$

We get energy eigenvalues

$$E = (n_x + n_y + n_z + 3/2)\hbar\omega$$

The nucleon has g = 4 since we have p, n, and ↑ and ↓ spin. For

$$E = \frac{3}{2}\hbar\omega$$

We get 4 states, for

$$E = \frac{5}{2}\hbar\omega$$

12 states, and

$$E = \frac{1}{Z}\hbar\omega$$

24 states. Thus 4, 4 + 12 = 16,

$$= 4 + 12 + 24$$

= 40 are magic numbers

${}^4_2He$, ${}^{16}_8O$ and ${}^{40}_{20}Ca$ are very stable.

(50) (b)

In the Mayer and Jensen nuclear shell model, the spin-orbit interaction

$$H_{so} = -a1.s$$

Splits levels with the same/but different

$$j = s + i$$

For example, the $P_{1/2}$ and $P_{3/2}$ states both have 1 = 1 and S = 1/2, but the different values (1/2 and 3/2) produce different degeneracies (2 and 4). For the nuclide ${}^{17}_8O$, the proton configuration is

$$(1s_{1/2})^2(1p_{3/2})^4(1p_{1/2})^2$$

and the neutron configuration is

$$(1s_{1/2})^2(1p_{3/2})^4(1p_{1/2})^2(1d_{5/2})^1$$

The ground state nucleus spin is thus j = 5/2 from the unpaired neutron.

(51) (d)

The Zeemann effect may be explained semi-classically. Consider an electron orbiting in a circular orbit. The centripetal forces is

$$F_o = m\omega_o^2 r \text{ with } \beta = 0$$

$$F = m\omega_o^2 r \pm \frac{evB}{C} = m\omega^2 r \text{ with finite B}$$

and

Combining the two equations one gets

$$m(\omega_o{}^2 - \omega^2)r = \pm e\omega rB/C$$

or

$$(\omega + \omega_o)(\omega - \omega_o) = \pm e\beta\omega/mC$$

$$2\omega\delta\omega = \pm eB\omega/mC$$

Using the approximation that

$$\omega = \omega_o$$

Thus

$$\delta\omega = \pm eB/2mC$$

(52) (d)

In the photoelectric effect, by conservation of energy

$$hv = 1/2mv^2 + \phi$$

Where ϕ is the work function of the metal. Furthermore,

$$eV_o = 1/2mv^2$$

Thus, the stopping potential V_o is directly proportional to the incident light frequency V:

$$eV_o = hv - \phi$$

or

$$V_o = \frac{h}{e}v - \frac{\phi}{e}$$

In fact, this is one way of determining Planck's constant.

(53) (c)
The threshold wavelength allows us to determine the work function ϕ of the metal:

$$\phi = hv_o = hc/\lambda_o$$
$$= 12{,}400/2300 = 5.39 \text{ eV}$$

The incident light has energy

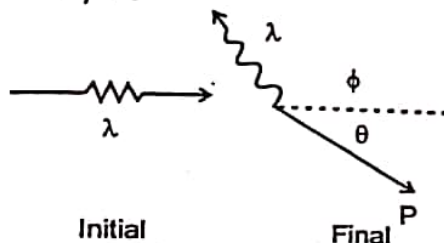
$$hv = hc/\lambda = 12{,}400/1500$$
$$= 8.27 \text{ eV}$$

Hence, the kinetic energy of the photoelectrons is

$$K = hv - \phi$$
$$= 8.27 - 5.39 = 2.88 \text{ eV}$$

Finally $\quad eV_o = K \Rightarrow V_o = 2.88$ volts

(54) (a)
In the Compton effect, photons scatter from electrons

$$\gamma + e \longrightarrow \gamma + e$$

The given wavelength is

$$\lambda = 1.50 \text{ Å}$$

then

$$\Delta\lambda = 2\lambda \sin^2 \phi/2$$

is the Compton shift where the Compton wavelength

$$\lambda_o = h/m_eC = (6.626 \times 10^{-27})/(9.109 \times 10^{-28})(3 \times 10^{10})$$
$$= 2.43 \times 10^{-10} \text{ cm} = 0.0243 \text{ Å}$$

Thus

$$\Delta\lambda = 2(.0243) \sin^2 90°/2 = 0.243 \text{ Å}$$

and

$$\lambda = \lambda + \Delta\lambda = 1.5243 \text{ Å}$$

Finally, the electron kinetic energy is

$$K = hc/\lambda - hc/\lambda = 12{,}400(1/1.50 - 1/1.5243)$$
$$= 131.8 \text{ eV}$$

(55) (a)
The observable is

$$f = C\sqrt{x/y}$$

and the standard error propagation formula is

$$\Delta f = \sqrt{\left(\frac{\partial f}{\partial x}\Delta x\right)^2 + \left(\frac{\partial f}{\partial y}\Delta y\right)^2}$$

$$= \sqrt{\left(\frac{C}{\sqrt{y}}\frac{1}{2\sqrt{x}}\Delta x\right)^2 \left(\sqrt{x}\frac{1}{2}\frac{1}{\sqrt{y^3}}\Delta y\right)^2}$$

$$= \sqrt{(c\sqrt{x/y})^2\left[\left(\frac{\Delta x}{2x}\right)^2 + \left(\frac{\Delta y}{2y}\right)^2\right]}$$

$$= \frac{1}{2}f\sqrt{\left(\frac{\Delta x}{2x}\right)^2 + \left(\frac{\Delta y}{y}\right)^2}$$

(56) (b)

We are given that

$$E = \frac{p^2}{2m} = bx^4$$

Now

$$< K.E > = \left(\frac{p^2}{2m}\right) = \frac{1}{2}KT$$

By the equiparition theorem. Also

$$< FE > = -\frac{d}{d^{\beta}} In \int_{-\infty}^{\infty} e^{-13bx^4} dx$$

Since

$$y^4 = \beta x^4, y = \beta^{1/4}$$

and

$$dy = \beta^{1/4} dx$$

$$< P.E > = -\frac{d}{d\beta} In\beta^{-1/4} \int_{-\infty}^{\infty} e^{-by^4} dy$$

$$= -\frac{d}{d\beta}\left(-\frac{1}{4} In\beta + In \int (...)dy\right) = \frac{1}{4}\beta$$

$$= \frac{KT}{4}$$

Hence $$< E > = \frac{1}{2}KT + \frac{1}{4}KT = \frac{3}{4}KT$$

(57) (a)

For the hydrogen atom

$$E_n = -13.6eV\frac{1}{n^2}$$

The K_α x-ray energy has energy

$$E_\alpha = -13.6\ eV\left(\frac{1}{2^2} - \frac{1}{1^2}\right) = 10.2eV$$

The initial energy of an 1-shell electron is

$$E = -13.6eV\frac{1}{2^2} = -3.4eV$$

After absorbing the photon and escaping, the kinetic energy of the electron is

$$K = 10.2 - 3.4$$
$$= 6.8\ eV$$

(58) (B)

In the Compton effect

$$\Delta\lambda = \lambda' - \lambda = 2h_c \sin^2\frac{\phi}{2}$$

For

$$\phi = \pi$$
$$\lambda' = \lambda^{o} + 2h/m_{e}C$$

High incident photon energy $E = hc/\lambda$ means small wavelength λ, nevertheless

$$\lambda' \geq \frac{2h}{m_{e}C}$$

and
$$E' = \frac{hc}{\lambda'} \leq \frac{1}{2}m_{o}C^{2}$$

(59) (b)

Several of the hydrogen like atom quantum mechanical wave functions are

$$\psi_{100} = \frac{2}{\sqrt{4\pi}}\left[\frac{Z}{a_{o}}\right]^{3/2} e^{-Z\sigma/\infty}$$

$$\psi_{200} = \frac{2}{\sqrt{4\pi}}\left(\frac{Z}{2a_{o}}\right)^{3/2}\left(1-\frac{Zr}{2a_{o}}\right)e^{-Zr/200}$$

$$\psi_{210} = \sqrt{\frac{3}{4\pi}}\cos\theta\left(\frac{Z}{2a_{o}}\right)^{3/2}\frac{Zr}{\sqrt{3}a_{o}}e^{-Zr/200}$$

$$\psi_{300} = \frac{2}{\sqrt{4\pi}}\left(\frac{Z}{3a_{o}}\right)^{3/2}\left(1-\frac{2Zr}{3a_{o}}+\frac{2(Zr)^{2}}{27a_{o}^{2}}\right)e^{-zr/300}$$

$$\psi_{321} = \sqrt{\frac{15}{8\pi}}\sin\theta\cos\theta e^{i\theta}\frac{2\sqrt{2}}{27\sqrt{5}}\left(\frac{Z}{3a_{o}}\right)^{3/2}\left(\frac{Zr}{a_{o}}\right)^{2} e^{-Zr/300}$$

In the 3-D picture, we have plotted

$$P(x, z) = \psi\psi^{*}(y = 0)$$

where $\cos\theta = z/r$ and $\sin\theta = x/r$

Only ψ_{321} has the rich structure pictured.

(60) (c)

The quantum mechanical harmonic oscillator has energy eigenvalues.

$$E_{n} = h\omega_{o}\left(n+\frac{1}{2}\right)$$

where
$$\omega_{o} = \sqrt{\frac{K}{m}}$$

and wave functions

$$\phi(x) = n(x)e^{-\alpha^{2}x^{2}/2}$$

where
$$\alpha = (mk/h^{2})^{1/4}$$

is a constant and the $\eta(x)$ are Hermite polynomials. For $n = 1$,

$$E_{1} = \frac{3}{2}h\omega_{o}$$

and
$$\phi_{1} = Nxe^{-\alpha^{2}x^{2}/2}$$

By the normalization condition

$$N^{2}\int_{-\infty}^{\infty} x^{2}e^{-\alpha^{2}x^{2}}dx = 1$$

Let $t = x^{2}$. Then

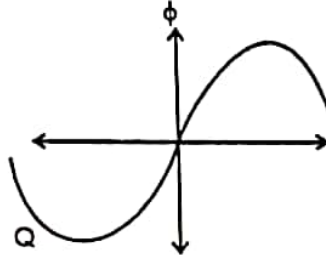
$$1 = N^{2}2\int_{0}^{\infty} t^{3/2-1}e^{-\alpha^{2}t}dt/2$$

$$= N^2 I\left(\frac{3}{2}\right)/(\alpha^2)^{3/2}$$

$$1 = N^2 \frac{1}{2} l/\alpha^3$$

$$N^2 = \alpha^3/(\sqrt{\pi}/2)$$

$$= 2\alpha^3/\sqrt{\pi}$$

Finally $N = \sqrt{2\alpha^3/\sqrt{\pi}}$

(61) (d)

This question concerns some of the basic properties of nucleons and nuclei Protons and neutrons are nucleons. They are also fermions since they have spins = 1/2 h. Their orbital angular momentum is. integral $\ell = 0, 1, 2, \ldots\ldots$ The total angular momentum of collections of nucleons in nuclei is

$$J = \sum_{i=1}^{A} J$$

and is

(i) integral for even A nuclei.

(ii) half integral for odd A nuclei.

and (iii) zero for even Z, even N nuclei.

(62) (b)

In the Roman effect, an incident beam of monochromatic light of frequency ω induces a dipole moment in a molecule. This inelastic results in scattered radiation of frequency

$$\omega'' = \omega \pm \omega'$$

depending on whether $h\omega'$ of energy is given to or taken from the molecule. The electric field of the light interacts with the molecule. The incident light can be of any frequency whereas in fluorescence, the incident photon must be at the proper molecular absorptive frequency.

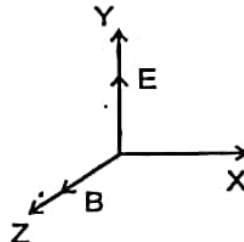
(63) (a)

Maxwell's equations in free space are

$$V.2 = 0 \qquad V \times E = \frac{-\partial B}{\partial t}$$

$$V.B = 0 \qquad V \times B = \mu_o \varepsilon_o \frac{\partial E}{\partial t}$$

and

They yield a wave equation

$$\nabla^2\begin{pmatrix}E\\B\end{pmatrix} = \mu_o\varepsilon_o\frac{\partial^2}{\partial t^2}\begin{pmatrix}E\\B\end{pmatrix}$$

where
$$C^2 = \frac{1}{\mu_o\varepsilon_o}$$

A plane wave solution is
$$E = YE_{oy}\cos(\omega t - kx + \alpha) + ZE_{a}\cdot\cos(\omega t - kx + \beta)$$

and
$$B = -y\frac{E_{oz}}{C}\cos(\omega t - Kx + \beta) + Z\frac{E_{or}}{C}\cos(\omega t - kx + \alpha)$$

Since
$C = \omega/k$ Now if $\delta = \beta - \alpha$, then
$$\left[\frac{E_y}{E_{oy}}\right]^2 + \left[\frac{E_z}{E_{oz}}\right]^2 = \cos^2\phi + \cos^2(\delta + \phi)$$

where
$\phi = \omega t - kx + \alpha$ clearly for $\delta = \pm\pi/2$

we get elliptical polarization
$$\left[\frac{E_y}{E_{oy}}\right]^2 + \left[\frac{E_z}{E_{oz}}\right]^2 = 1$$

(64) (b)
Note that Ag is the substance. We find its work function
$$\phi = h\nu_o = hc/\lambda_o$$
$$= 12{,}400 \text{ eV . Å}/2638 \text{ Å} = 4.70 \text{ eV}$$

The energy of the incident light is
$$E = h\nu = hc/\lambda = 12{,}400/1600 = 7.75 \text{ eV}$$

Thus, the kinetic energy of the photoelectrons is
$$T = h\nu - \phi = 7.75 - 4.70 = 3.05 \text{ eV}$$

Finally
$$T = \frac{1}{2}mv^2$$

$\Rightarrow$
$$V = \sqrt{(3.05)(2)/(511{,}000)}c$$
$$= 1.04 \times 10^6 \text{ m/s}$$

(65) (a)
This is a standard Compton scattering problem
We are given that
$$\lambda = 6.20 \text{ Å}$$

Hence
$$E = \frac{hc}{\lambda}$$
$$= \frac{12.4\text{KeV} - \text{Å}}{6.2\text{Å}}$$
$$= 2.0 \text{ KeV}$$

The Compton shift is
$$\phi = 180°$$

$$\Delta\lambda = 2\lambda_c \sin^2\frac{\phi}{2}$$

$\Rightarrow$

$$= 2(.0242)(1) = .484 \text{ Å}$$

Thus, the photon wavelength and energy in the final state is

$$\lambda' = \lambda + \Delta\lambda = 6.2484 \text{ Å}$$

$$E' = \frac{hc}{\lambda'}$$

$$= 1.985 \text{ KeV}$$

The Compton energy shift is then

$$\Delta E = E - E'$$

$$= .015 \text{ KeV}$$

$$= 15.5 \text{ eV}$$

(66) (b)

The ideal system of N spins is an example of the binomial distribution

where

$$P = P(\uparrow)$$

and

$$q = 1 - P = P(\downarrow)$$

The mean magnetic moment for one spin is

$$<\mu> = \rho\mu_o + (1 - P)(-\mu_o)$$

$$= (2P - 1)\mu_o$$

and

The single spin variance is

$$\sigma^2 = <(\mu - <\mu>)^2> = <\mu^2> - <\mu>^2$$

$$= P\mu_o^2 + (1 - P)\mu_o^2 - (2P - 1)\mu_o^2$$

$$= 4Pq\mu_o^2$$

Hence

for N spins,

$$<M> = N(2P - 1)\mu_o$$

and

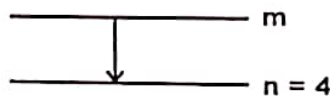
$$\sigma_M^2 = 4NPq\,\mu_o^2$$

(67) (a)

The Brackett series in hydrogen involves transitions from energy level into energy level $n = 4$ resulting in the emission of a photon. The wavelength is found from

$$1/\lambda = R(1/n^2 - 1/m^2)$$

where

R is the Rydberg constant

The upper limit comes from m = 5

$$1/\lambda = 109{,}677.6(^1/_{16} - {}^1/_{25})$$

Which gives $\lambda = 40{,}500$ Å

$$= 4050 \text{ nm}$$

(68) (c)

The Bohr-Sommerfeld quantization rule is

$$\frac{1}{2\pi}\int P dy = nh$$

For a ball bounding in one dimension y, the energy is

$$E = T + U = \frac{P^2}{2n} + mgy$$

Thus

$$\frac{1}{2\pi}.2\int_0^{E/my}\sqrt{2m(E-mgy)}dy = nh$$

$$nh = \frac{-2}{2\pi}\sqrt{2mE\frac{2}{3}}\left(1-\frac{mgy}{E}\right)^{3/2}\frac{E}{my};\ y=\frac{E}{mg},\ y=0$$

Simplifying, we get

$$\frac{2}{3\pi g}\sqrt{\frac{2}{m}}E^{3/2} = nh$$

or

$$E_n = (9\pi^2 g^2 n^2 h^2 m/g)^{1/3}$$

(69) (b)
The degeneracy for the H-like atom problem is found from thinking about the quantum numbers which describe a state, n = 1, 2, 3, ... is the principal quantum number l = 0, 1, 2, ..., n − 1 is the orbital quantum number $m_l = -1, -(1-1), \ldots -1, 0, 1, \ldots, 1-1$ is the magnetic quantum number. Hence, the degeneracy g is the number of states that have the same energy E_n

$$g = \sum_{l=0}^{n-1}(2l-1)$$

$$= 2\sum_{l=0}^{n-1}l + \sum_{l=0}^{n-1}1$$

$$= 2\frac{(n-1)(n)}{2} + n$$

$$= n^2$$

(70) (a)
The Schrodinger equation for l = 0 is

$$\frac{1}{R}\frac{d}{dr}\left(r^2\frac{dR}{dr}\right) + \frac{2\mu r^2}{h^2}(E-U) = 0$$

Now
The wave function is given as

$$R_{10}(r) = Ne^{-2r/a_0}$$

and

The potential energy is $U(r) = -Kze - \frac{Z}{a_o}R\left(2r - \frac{Z}{a_o}r^2\right)^2/r$

Differentiating one obtains

$$\frac{d}{dr}\left(r^2\frac{dR}{dr}\right) = -\frac{Z}{a_o}R\left(2r - \frac{Z}{a_o}r^2\right)$$

Hence
We have

$$\left(-\frac{2Z}{a_o} + \frac{2\mu KZe^2}{h}\right)r + \left(\frac{Z^2}{a_o^2} + \frac{2\mu E}{h}\right)r^2 = 0$$

Thus the Bohr radius is

$$a_o = \frac{h^2}{K\mu e^2}$$

and the energy eigenvalue is

$E = -h^2Z^2/2\mu a_o^2 = -K^2Z^2\mu$

(71) (b)
The angular part of the wave function is a spherical harmonic

$$Y_{lml} = Y_{22} = \frac{1}{4}\sqrt{\frac{15}{2\pi}}\sin^2\theta e^{2i\phi}$$

and The radial part is

$$R_{nl} = R_{32} = \frac{2\sqrt{2}}{27\sqrt{5}}\left(\frac{Z}{3a_o}\right)^{3/2}\left(\frac{Zr}{a_o}\right)_e^2 - Zr/3a_o$$

The complete wave function is

$$\psi_{nlmy}(r;\theta,\phi) = R_{nl}(r)y_{lmy}(\theta,\phi)$$

Fortunately, L, only operates on the ψ component

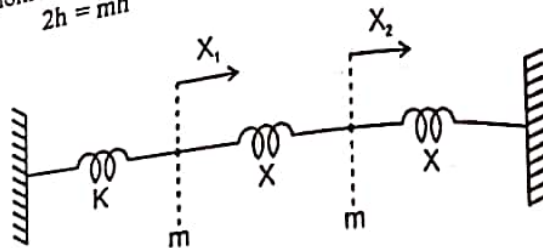
$$L_z\psi = \frac{h}{i}\frac{\partial}{\partial\phi}\psi$$

$$= \frac{h}{i}2i\psi$$

$$= 2h\psi$$

Hence, the angular momentum eigenvalue is

$$2h = mh$$

(72) (c)

Newton's second law states

$$F_1 = mx_1'' = -Kx_1 - Kx_1 + Kx_2 = -Kx_1 + K(x_2 - x_1)$$

$$F_2 = mx_2'' = -Kx_2 - Kx_2 + Kx_1 = -Kx_2 - K(x_2 - x_1)$$

The solutions are

$$X_1 = A\cos(\omega t \times \delta)$$

and

$$X_2 = B\cos(\omega t \times \delta)$$

The easiest way to find, the frequencies is to add and subtract th- equations to get

$$my'' = -Ky$$

$$y = x_1 + x_2$$

$$mz'' = -(K + 2K)Z$$

$$Z = x_2 - x_1$$

The symmetrical mode frequency Is thus

$$\omega_2 = \sqrt{\frac{K}{m}}$$

and

the anti-symmetrical one is

$$\omega_a = \sqrt{(K+2K)/m}$$

(73) (a)
(74) (b)
(75) (c)
(76) (d)

(77) (a)
(78) (d)
(79) (a)
(80) (b)
(81) (c)
(82) ()

Spin orbit coupling result in an energy change

$$\Delta E = a\Delta(1 \, . \, s)$$

The total angular momentum is

$$j = 1 + s$$
$$j^2 = (1 + s)^2$$
$$= 1^2 + s^2 + 21 \, . \, s$$

Now

the eigenvalues of any angular momentum operator follow the rule

Thus $j^2\psi = (j(j + 1))\psi$

The two states have $1 \, . \, s = (j(j + 1) - 1(1 + 1) - s(s+1))/2$

and $(j, 1, s) = \left(\frac{3}{2}, 1, \frac{1}{2}\right)$

$\left(\frac{1}{2}, 1, \frac{1}{2}\right)$

Respectively

Hence,

$$1 \, . \, s = \left(\frac{15}{4} - 2 - \frac{3}{4}\right)/2 \quad = 1/2, -1$$

$$\Delta(1 \, . \, s) = \left(\frac{1}{2} + 1\right) = \frac{3}{2}$$

$$a = \frac{\Delta E}{\Delta 1 \, . \, s}$$

(83) (b)

This is a standard Compton scattering problem

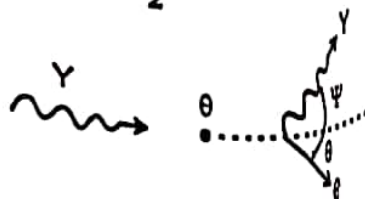
With

and $\lambda = 3.00 \text{ Å}$

Given $\psi = 45.0°$

The Compton shift is

$$\Delta\lambda = 2\lambda_o \sin^2 \frac{\psi}{2} = \lambda' - \lambda$$

The Compton wavelength is

$$\lambda_c = \frac{h}{mlc}$$

$$= \frac{6.626\times10^{-34}}{(9.109\times10^{-31})(3\times10^{8})}$$

$$= 2.42 \times 10^{-12}\ \text{m}$$

$$= .0242\ \text{Å}$$

Hence

$$\Delta\lambda = 2(.0242)(\sin^2 22.5°)$$

$$= 0.71\ \text{Å}$$

Finally

$$\lambda = \lambda + \Delta\lambda = 3.07\ \text{Å}$$

(84) (a)

According to the Bohr Theory

$$1/\lambda = R(1/n^2 - 1/m^2)$$

$$= 1.0977373 \times 10^{-3}\ (1/n^2 - 1/m^2)/\text{Å}$$

where

R is the Rydberg constant

$$B = 1.097 \times 10^{7}\ \text{m}^{-1}$$

$$= 1.097 \times 10^{-3}\ \text{A}^{-1}$$

For the Lyman series,

$$n = 1$$

For the series upper limit

$$m = n + 1 = 2$$

Hence

$$\lambda = 1216\ \text{Å}$$

For the Balmer series

$$n = 2$$

Thus

$$\lambda = 6565\ \text{Å}$$

For the Paschen series

$$n = 3$$

Therefore

$$\lambda = 18760\ \text{Å}$$

For the Brackett series

$$n = 4$$

Hence

$$\lambda = 40520\ \text{Å}$$

For the Pfund series

$$n = 5$$

Thus

$$\lambda = 74600\ \text{Å}$$

Clearly the Paschen series, discovered in 1908 is the answer.

(85) (a)

In the Thomson atom, the electrons are dispersed throughout a positive nuclear fluid. Applying Gauss, law

$$\nabla . E = \frac{p}{\varepsilon_o}$$

$$\oint E.da = \frac{q}{\varepsilon_o}$$

Integrating over the inner sphere, we obtain

$$E \cdot 4\pi r^2 = P\frac{4}{3}\pi r^3/\varepsilon_o$$

$$E = \frac{e}{4/3\pi r^3}\frac{4}{3}\pi r^3/4\pi r^2\varepsilon_o$$

$$\Rightarrow \qquad E = \frac{e}{4\pi\varepsilon_o R^3}r$$

The electron vibrates in this positively charged fluid so that

$$F = (-P^2/4\pi\varepsilon_o R^3)r = mr''$$

$$r'' + \frac{e^2}{4\pi\varepsilon_o R^3 m} - P = 0$$

$$r'' + \omega_o 2r = 0$$

$$\omega_o = \sqrt{e^2/4\pi\varepsilon_o R^3 m}$$

$$= \sqrt{(1.602\times10^{-19})^2/4\pi(8.84\times10^{-12})(10^{-10})^3(9.108\times10^{-31})}$$

$$= 1.592\times10^{16}\ \text{rad/s}$$

$$\lambda = 2\pi c/\omega$$

$$= 2\pi(3\times10^8)/(1.592\times10^{16})$$

$$= 1184\ \text{Å}$$

(86) (b)

The Schrodinger equation is for the two particle system is

$$\left(-\frac{h^2}{2m}(\nabla_1^2+\nabla_2^2)+V_o\delta^3(r_1-r_2)\right)\psi(r_1,r_2) = E\psi(r_1,r_2)$$

For

$$V_o = 0$$

$$w_o = (hk_1)^2/2m + (hk_1)^2/2m$$

$$= (h^2/2m)(3+3)\pi^2/a^2$$

$$= 3h^2\pi^2/ma^2$$

where

We have used the fact that $K_1 = \pi/a\ (n_x X + n_y Y + n_z Z)$

and

$$n_x = n_y = n_z = 1$$

For the ground state (Similarly for K_2)

$$w_1 = \langle 0|V|0\rangle$$

where

We have used to fact that

$$\psi = (2/a)^3\sin(R/0x_1)\sin(R/0x_2)\sin(R/0y_1)\sin(R/0y_2)$$

$$\sin(R/0Z_1)\sin(R/0Z_2)$$

$$W_1 = (2/0)^6 V_o\left(\int\sin^4(R/0x_1)dx_1\right)^3$$

Thus

$$= (2/0)^6 V_o(3/8\pi0/R)^3$$

$$= (3/2a)^3 V_o$$

Finally

(87) (c)

$$E_o = w_o + w_1 - \ldots$$

The s shell has $l = 0$ and the p shell has $l = 1$

Hence $m_l = -1, 0, 1$

The possible states taking each electron separately are then

where the first electron is on the first line, the second electron on the second line, and the third electron on the third line. Now

We count states with two electrons in one state and the other electron separate.

Hence there are a total of 20 states, as one expects from the binomial coefficient.

$$\binom{6}{3} = \frac{61}{3131} = 20$$

(88) (a)

It is desired to use the nuclear shell model to find the $^{67}_{30}Zn$ spin. The proton configuration

$(1s_{1/2})^2(1p_{3/2})^4(1p_{1/2})^2(1d_{5/2})^6(2s_{1/2})^2(1d_{3/2})^4(1f_{7/2})^8(2p_{3/2})^2$

and the neutron configuration is

$$(1s_{1/2})^2....(2p_{3/2})^4(1f_{5/2})^5$$

One looks for unpaired nucleons to determine j. Only one if 5/2 neutron is unpaired. Thus

$$j = \frac{5}{2}$$

****

Modern Physics

Select the correct answer and encircle it.

RELATIVE MOTION AND THEORY OF RELATIVITY

1. The concept of direction is purely:
   - (A) Absolute
   - (B) Relative
   - (C) Relative to stars always
   - (D) Relative to the sun always
   - (E) None of these
2. All motions are:
   - (A) Relative to a person
   - (B) Relative to the instrument observing it
   - (C) Absolute
   - (D) Both (A) and (B)
   - (E) None of these
3. A body at rest remains at rest unless:
   - (A) A balanced force produces motion in it
   - (B) An unbalanced force produces acceleration in it
   - (C) An unbalanced force does not produce acceleration in it
   - (D) A balanced force produces acceleration in it
   - (E) None of these
4. Strictly speaking, the earth is:
   - (A) An accelerated frame of reference
   - (B) A non-inertial frame of reference
   - (C) An inertial frame of reference
   - (D) A non-accelerated frame of reference
   - (E) Both (A) and (B)
5. The special theory of relatively treats the problems involving:
   - (A) Inertial frames of reference
   - (B) Non-inertial frames
   - (C) Non-accelerated frames
   - (D) Both (A) and (C)
   - (E) Both (B) and (C)
6. The general theory of relativity treats the problems involving frames of reference which are:
   - (A) Inertial
   - (B) Accelerating with respect to one another
   - (C) Accelerating with respect to a particular star
   - (D) Moving with uniform velocity
   - (E) None of these
7. The special theory of relativity is based on:
   - (A) Four postulates
   - (B) Three postulates
   - (C) Two postulates
   - (D) One postulate
   - (E) None of these
8. There is no way to detect:
   - (A) Absolute uniform motion
   - (B) Accelerated motion
   - (C) State of rest
   - (D) State of motion
   - (E) None of these
9. Time:
   - (A) Is an absolute quantity
   - (B) Is relative
   - (C) Depends upon motion of frame of reference
   - (D) All above
   - (E) None of these
10. The symbol to be used in relativity problems denotes:
    - (A) Dilated time
    - (B) Proper time
    - (C) Life time
    - (D) Half life
    - (E) None of these
11. Practically the quantity $\frac{v}{c}$ is always:
    - (A) Less than one
    - (B) Equal to one
    - (C) Greater than one
    - (D) All of these

(E) None of these

12. Tick the correct statement:
(A) t_o is always less than t
(B) m_o is always greater than m
(C) l_o is always less than l
(D) Both (A) and (C)
(E) Both (B) and (C)

13. Due to relative motion of observer and the frame of reference of events, time always:
(A) Dilates itself
(B) Contracts itself
(C) Stretches itself
(D) Both (A) and (C)
(E) None of these

14. The dilation of time applies to the timing processes which are:
(A) Physical
(B) Chemical
(C) Biological
(D) All of these
(E) None of these

15. Aging process of the human body:
(A) Becomes slow by motion at very high speed
(B) Becomes fast at very high speed
(C) Is not affected when its speed becomes extremely large
(D) All of these are true
(E) None is true

16. As compared to the distance measured by an observer on Earth, the distance from Earth to a star measured by an observer in a moving spaceship would seem:
(A) Smaller
(B) Larger
(C) Same
(D) Much larger
(E) None of these

17. Mass of an object:
(A) Is a varying quantity
(B) Depends upon the speed of object
(C) Indicates its inertia
(D) All above
(E) None of these

18. Earth's orbital speed is:
(A) $30\ ms^{-1}$
(B) $30\ kms^{-1}$
(C) $3 \times 10^4\ ms^{-1}$
(D) Both (A) and (C)
(E) Both (B) and (C)

19. Tick the correct relativistic equation/s:
(A) $m_o = m\sqrt{1 - \frac{v^2}{c^2}}$
(B) $l_o = l_o\sqrt{1 - \frac{v^2}{c^2}}$
(C) $m = \frac{m_o}{\sqrt{1 - \frac{v^2}{c^2}}}$
(D) All of these
(E) Both (B) & (C)

20. The ratio of speed of light to the orbital speed of Earth is:
(A) 10^4
(B) 10^3
(C) 10^2
(D) 10^5
(E) $10^6\ kms^{-1}$

21. Tick the correct relativistic equation/s:
(A) $\ell = \frac{l_o}{\sqrt{1 - \frac{v^2}{c^2}}}$
(B) $t = \frac{t_o}{\sqrt{1 - \frac{v^2}{c^2}}}$
(C) $t = t_o\sqrt{1 - \frac{v^2}{c^2}}$
(D) Both (A) and (B)
(E) All of these

22. When the atomic particles are moving with velocities approaching that of light:
(A) Newton's laws become valid
(B) Relativistic effects become prominent
(C) Both (A) and (B) are valid
(D) Neither (A) nor (B)

(E Their mass becomes zero.

23. **According to special theory of relativity, mass and energy are:**
(A) Different entities
(B) Related as $E = mc^2$
(C) Inter-convertible
(D) Similar entities
(E) All are true except (D).

24. **It implies from $\Delta m = \frac{\Delta E}{c^2}$ that to get even a small increase in mass of an object, we require:**
(A) Small changes in energy
(B) Large changes in energy
(C) Very small changes in energy
(D) Any of these
(E) None of these

25. **By taking the relativity effects into account, the location and speed anywhere on Earth can be determined to an accuracy of about:**
(A) $2\ ms^{-1}$
(B) $20\ cms^{-1}$
(C) $2\ cms^{-1}$
(D) $20\ ms^{-1}$
(E) None of these

BLACK BODY RADIATION AND ELECTROMAGNETIC WAVE SPECTRUM

26. **The nature of radiations emitted by a hot body depends upon its:**
(A) Material
(B) Temperature
(C) Colour
(D) Volume
(E) Length

27. **At low temperatures, the hot body emits radiations of:**
(A) Low energy
(B) Shorter wavelength
(C) High energy
(D) High frequency
(E) Both (B) and (D)

28. **At high temperature, the hot body emits radiations of:**
(A) High energy
(B) Longer wavelength
(C) Shorter wavelength
(D) Both (A) and (B)
(E) Both (A) and (C)

29. **A radiation of longer wavelength:**
(A) Possesses high energy
(B) Possesses low energy
(C) Is available at high temperature
(D) Is available at low temperature
(E) Both (B) and (D)

30. **As the temperature of a hot body rises, the proportion of:**
(A) Shorter wavelength radiation increases
(B) Longer wavelength radiation decreases
(C) Longer wavelength radiation increases
(D) Both (A) and (B)
(E) Both (A) and (C)

31. **When platinum wire is heated, then at the temperature of 500°C, it becomes:**
(A) Yellow
(B) Orange red
(C) Dull red
(D) White
(E) Cherry red

32. **As the platinum wire is heated, its colour changes from:**
(A) Dull red to cherry red
(B) White to yellow
(C) Orange red to dull red
(D) Yellow to cherry red
(E) Any of these

33. **Black colour is:**
(A) A good absorber of heat
(B) A bad absorber of heat
(C) A good reflector of heat
(D) Both (A) and (C)
(E) Both (A) and (B)

34. **The intensity of emitted energy (with wavelength) radiated from a black body at different temperatures was initially measured by:**
(A) Lummer
(B) Planck

(C) Pringsheim
(D) Both (A) and (B)
(E) Both (A) and (C)

35. **The product of λ_m and T is called:**
(A) Planck's constant
(B) Wien's constant
(C) Lummer's constant
(D) Pringshein's constant
(E) None of these

36. **Wien's constant is measured in:**
(A) Metre per kelvin
(B) Metre kelvin
(C) Kelvin per metre
(D) Joules
(E) Dynes

37. **$\lambda_m \times T$ = constant means that as the temperature T:**
(A) Increases λ_m shifts to longer side of graph
(B) Decreases, λ_m shifts to shorter side
(C) Both (A) and (B)
(D) Increases, λ_m shifts to shorter side
(E) Both (B) and (D)

38. **The radiant energy:**
(A) Always increases with increase in wavelength
(B) Always decreases with decrease in wavelength
(C) Initially increases and then decreases
(D) Both (A) and (B)
(E) None of these

39. **Planck suggested that energy is radiated or absorbed:**
(A) In discrete packets
(B) As continuous wave
(C) Mixture of (A) and (B)
(D) Any of these
(E) None of these

40. **The ratio of energy E to the corresponding frequency (f) of the radiation (emitted or absorbed) is called:**
(A) Wien's constant
(B) Stefen's constant
(C) Planck's constant
(D) Boltzmann's constant
(E) None of these

41. **The value of Wien's constant in SI units is:**
(A) 2.9×10^{-3}
(B) 6.63×10^{-34}
(C) 5.67×10^{-8}
(D) 3×10^{8}
(E) None of these

42. **Max Planck received the Nobel Prize for his discovery of energy quanta in:**
(A) 1718 AD
(B) 1918 AH
(C) 1818 AD
(D) 1918 AD
(E) None of these

43. **The value of Stefen's constant in SI units is:**
(A) 3×10^{8}
(B) 5.67×10^{-8}
(C) 2.9×10^{-3}
(D) 6.63×10^{-34}
(E) None of these

44. **From the theory of relativity, the momentum p of the photon is expressed as:**
(A) $\frac{hc}{\lambda}$
(B) $\frac{h}{\lambda}$
(C) $\frac{hf}{c}$
(D) Either (A) or (B)
(E) Either (B) or (C)

45. **The value of Planck's constant in SI units is:**

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(A) 5.67×10^{-8} (B) 2.9×10^{-3}
(C) 6.63×10^{34} (D) 3×10^{8}
(E) None of these

46. The SI unit of Stefen's constant is:
(A) ms^{-1} (B) mK
(C) $Wm^{-2}K^{-4}$ (D) Js
(E) mK^{-1}

47. If p represents linear momentum and c, the velocity of light, then unit of pc in international system of units is:
(A) Newton (B) Joule
(C) Joule-sec (D) Joule-s^{-1}
(E) Watt

48. The detection of r-radiation with energy ~ 1 MeV as quanta is:
(A) Not possible (B) Possible by radiation detector
(C) Is possible by counter (D) Possible with open eye
(E) Both (B) and (C)

PHOTOELECTRIC AND COMPTON EFFECTS, PAIR PRODUCTION AND ANNIHILATION

49. The way through which electromagnetic radiations or photons interact with matter depends upon their:
(A) Wavelength (B) Frequency
(C) Energy (D) Temperature
(E) All of these

50. Electromagnetic radiation means:
(A) Photons (B) Protons
(C) Electrons (D) Mesons
(E) None of these

51. The process through which photons can interact with matter is:
(A) Photoelectric effect (B) Compton effect
(C) Pair production (D) Any of these
(E) None of these

52. Photoelectric effect means the emission of:
(A) Electrons from a metal surface at its exposure to light
(B) Protons from a metal surface
(C) Photons from a metal surface
(D) Photoelectrons from a metal surface
(E) Either (A) or (D)

53. Photoelectrons are actually:
(A) Photons emitted in photoelectric effect
(B) Electrons emitted in photoelectric effect
(C) Neither photons nor electrons
(D) Either (A) or (B)
(E) None of these

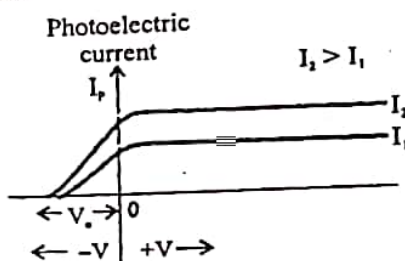
54. In demonstrating photoelectric effect, when light falling on the cathode is cut off, the ammeter shows:
(A) No photons passing through it
(B) No electrons passing through it
(C) No mesons passing through it
(D) Maximum number of electrons passing through it
(E) None of these

55. The maximum energy of photoelectrons can b

(A) Removing the battery from the apparatus
(B) By connecting negative terminal of the battery to anode of the tube
(C) By connecting positive terminal to cathode
(D) Both (B) and (C)
(E) None of these

56. **If the photoelectric current goes on decreasing, it means that:**
(A) Photons are attracted by the anode
(B) Photoelectrons are repelled by the anode
(C) Photoelectrons are attracted by the anode
(D) Photons are repelled by the anode
(E) None of these

57. **The amount of photoelectric current depends upon:**
(A) Energy of incident photons
(B) Intensity of light beam
(C) Both (A) and (B)
(D) Magnitude of stopping potential
(E) None of these

58. **The symbol I_p in figure. means:**

Photoelectric current I_p
$I_2 > I_1$
I_2
I_1
$\leftarrow V_o \rightarrow$ 0
$\leftarrow -V$ | $+V \rightarrow$

(A) Plate current
(B) Current in the primary coil
(C) Both (A) and (B)
(D) Photoelectric current
(E) Any of these

59. **The symbols I_1 and I_2 in figure. denote:**
(A) Intensities of incident light
(B) Currents at different instants
(C) Photoelectric currents
(D) Currents in different branches of the circuit (used to show photoelectric effect)
(E) None of these

60. **While demonstrating the photoelectric effect, the stopping potential is achieved when:**
(A) Battery is disconnected
(B) Anode is made more and more positive
(C) Current becomes zero
(D) Any of these
(E) Both (B) and (C)

61. **The maximum energy of photoelectrons depends on:**
(A) Nature of metal surface
(B) Frequency of incident light
(C) Intensity of incident light
(D) Both (B) and (C)
(E) None of these

62. **Threshold frequency is the:**
(A) Minimum frequency below which no electrons are emitted
(B) Same for all metals
(C) Both (A) and (B)
(D) Various from metal to metal
(E) Both (A) and (D)

63. **Intensity of light determines the:**
(A) Energy of each photon
(B) Number o
(C) Speed of photons
(D) Size of
(E) None of these

64. **The emission of photoelectrons depends upon:**
(A) Magnitude of stopping potential
(B) Value of threshold frequency

(C) Intensity of incident photons
(D) Both (A) and (B)
(E) Both (A) and (C)

65. The classical (electromagnetic wave) theory of light cannot explain:
(A) Difference between intensity and energy
(B) Threshold frequency of light
(C) Instantaneous emission of photoelectrons
(D) Any of them
(E) None of these

66. The idea of quantization of energy was proposed by:
(A) Einstein (B) Max. Planck
(C) Maxwell (D) Bohr
(E) Rutherford

67. Tick the correct relation:
(A) $hf = \phi + \frac{1}{2}mv_{max}^2$ (B) $hf = \frac{1}{2}mv_{max}^2 - \phi$
(C) $\phi = hf + \frac{1}{2}mv_{max}^2$ (D) $\phi = \frac{1}{2}mv_{max}^2 - hf$
(E) Both (B) and (D)

68. In the equation $hf - \phi = \frac{1}{2}mv_{max}^2$, let $K.E_{max}$ of photoelectrons become zero, then:
(A) $\phi = hf$ (B) $\phi = hf_o$
(C) $\phi < hf_o$ (D) $\phi > hf_o$
(E) None of these

69. The Nobel Prize on the explanation of photoelectric effect was awarded to:
(A) Max. Planck (B) Maxwell
(C) Bohr (D) Rutherford
(E) None of these

70. Einstein was awarded Nobel Prize on the basis of:
(A) Theory of relativity (B) Explanation of photoelectric effect
(C) Quantum theory of light (D) Superconductivity
(E) Ether theory

71. The part/s of a photocell is/are:
(A) Evacuated glass tube (B) Thin anode rod
(C) Cathode of an appropriate metal surface (D) Both (A) and (C)
(E) All of these

72. Photoelectrons are emitted when visible light falls on:
(A) Sodium (B) Cesium coated oxidized silver
(C) Potassium (D) Both (A) and (C)
(E) Both (B) and (C)

73. When a photo-emissive surface is exposed to light of some suitable frequency:
(A) Photons are emitted (B) Photoelectrons are emitted
(C) Protons are emitted (D) Photograph can be taken
(E) None of these

74. Photoelectrons are emitted when infrared light falls on:
(A) Potassium (B) Cesium coated oxidized silver
(C) Sodium (D) Both (A) and (C)
(E) Both (B) and (C)

75. A photocell can be used to operate:
(A) Security systems (B) Counting systems
(C) Automatic door system (D) Both (A) and (C)
(E) All of these

76. Photoelectrons are emitted when ultraviolet light falls on:
(A) Cesium (B) Silver
(C) Potassium (D) ... of these
(E) None of these

77. **The unit of work function is:**
(A) Joule (B) Electron volt
(C) That of threshold frequency (D) Both (A) and (B)
(E) None of these

78. **The threshold frequency of sodium is 6×10^8 MHz. The cut-off wavelength for this metal will be:**
(A) 500 m (B) 500 nm
(C) 500 km (D) 500 cm
(E) None of these

79. **The work function has the value of 3.94×10^{-19} J for sodium. The threshold frequency of sodium will be:**
(A) 6×10^8 Hz (B) 6×10^{14} MHz
(C) Both (A) and (B) (D) 6×10^8 MHz
(E) 6×10^{20} Hz

80. **1.6 eV means:**
(A) 10^{19} J (B) 2.56 J
(C) 2.56×10^{-19} J (D) $2.56 \times 10^{+19}$ J
(E) None of these

81. **The work function of certain metal is 2.46 eV. If a photon of 4.14 eV strikes this metal, it will emit a photoelectron of energy equal to:**
(A) 7.6 eV (B) 1.68 eV
(C) 1.6829 eV (D) 10.18 eV
(E) 101.8 eV

82. **A. H. Compton studied scattering of x-rays by:**
(A) Loosely bound electrons (B) Tightly bound electrons
(C) Tightly bound protons (D) Loosely bound photons
(E) None of these

83. **Compton studied the scattering of x-rays by loosely bound electrons from:**
(A) NaCl crystal (B) Graphite crystal
(C) Zirconia (D) Copper crystal
(E) None of these

84. **Compton found by his scattering experiment that the wavelength of scattered x-rays is:**
(A) The same as that of incident x-rays
(B) Larger than λ of incident x-rays
(C) Smaller than λ of incident x-rays
(D) Any of these
(E) None of these

85. **Compton found by his scattering experiment that λ_s/λ_i i.e., the ratio of wavelengths of scattered and incident x-rays is:**
(A) Less than one (B) Equal to one
(C) Greater than one (D) Any of these
(E) None of these

86. **Compton derived an expression to find Compton shift by applying to the process, the law of conservation of:**
(A) Energy only (B) Momentum only
(C) Mass only (D) Charge only
(E) Both (A) and (B)

87. **Compton shift is actually the change in:**
(A) Wavelength of incident photon (B) Mass of incident photon
(C) Mass of loosely bound electron (D) Total charge
(E) None of these

88. **The factor $\frac{h}{m_o c}$ in Compton's equation has the dimensions of:**
(A) Pressure (B) Angular momentum
(C) Length (D) Momentum
(E) Mass

89. **Compton shift is equal to Compton wavelength when the scattered X-ray photons are observed at an angle:**
(A) 0° (B) 30°

(C) 60° (D) 90°
(E) 180°

90. The year when A.H. Compton was awarded Nobel Prize is:
(A) 1923 (B) 1927
(C) 1931 (D) 1935
(E) None of these

91. When X-rays are scattered by loosely bound electrons from a graphite target, it is known as:
(A) Photoelectric effect (B) Compton effect
(C) Seebeck effect (D) Peltier effect
(E) Joule-Thomson effect

92. The year and place when and where A. H. Compton did his scattering experiment are:
(A) 1923, Washington University
(B) 1927, Lawrence Barkeley Laboratory
(C) 1923, China
(D) 1927, India
(E) None of these

93. Quasi-free electron means:
(A) Tightly bound electron (B) Loosely bound electron
(C) Completely free electron (D) Any of these
(E) None of these

94. Compton shift refers to:
(A) Photon (B) Meson
(C) Proton (D) Positron
(E) Both (B) and (D)

95. Photoelectric effect takes place with a photon of:
(A) High energy (B) Low energy
(C) Very high energy (D) Very low energy
(E) None of these

96. Compton effect takes place with a photon of:
(A) Very high energy (B) Very low energy
(C) Low energy (D) High energy
(E) None of these

97. A particle having mass and charge equal to that of an electron is called:
(A) Proton (B) Positron
(C) Pion (D) Pi-meson
(E) Both (C) and (D)

98. Pair production takes place with a photon of:
(A) Very high energy (B) Very low energy
(C) High energy (D) Low energy
(E) None of these

99. Radiant energy is converted into matter in case of:
(A) Photoelectric effect (B) Pair production
(C) Compton effect (D) Annihilation of matter
(E) None of these

100. Pair production is also called:
(A) Energy production (B) Charge creation
(C) Materialization of energy (D) Process of conversion of matter into energy
(E) None of these

101. The probability of pair production to take place is that energy of incident photon should:
(A) Be smaller than 1.02 eV
(B) Be greater than 1.02 MeV
(C) Smaller than 1.02 MeV
(D) Lie between 1.02 eV and 1.02 MeV
(E) Both (A) and (C)

102. The condition $hf > 2m_oc^2$ refers to the process of:
(A) Photoelectric effect (B) Compton effect
(C) Pair production (D) Annihilation of matter
(E) None of these

103. The equation $e^- + e^+ \longrightarrow \gamma + \gamma$ refers to:
- (A) Pair production
- (B) Annihilation of matter
- (C) Compton effect
- (D) Fission process
- (E) Fusion process

104. In the process of annihilation of matter, the two photons are produced travelling:
- (A) In the same direction
- (B) In opposite directions
- (C) At an angle of 60° with each other
- (D) At an angle of 180° w.r.t. each other
- (E) Both (B) and (D)

105. While the matter annihilates, the two photons travel in opposite directions so that:
- (A) Momentum is conserved
- (B) Charge is conserved
- (C) Angular momentum is conserved
- (D) Both (B) and (C)
- (E) Total mass is conserved

106. In the process of annihilation of matter, each photon produced has energy which is equivalent to:
- (A) Rest mass energy of an electron
- (B) m_oc^2 where m_o is rest mass of a photon
- (C) mc^2
- (D) 0.511 MeV
- (E) Both (A) and (D)

107. The existence of positron was predicted by:
- (A) Dirac in 1928
- (B) Compton in 1923
- (C) de Broglie in 1924
- (D) Heisenberg in 1932
- (E) None of these

108. The positron was discovered:
- (A) In cosmic radiation
- (B) In 1932
- (C) By Carl Anderson
- (D) All above
- (E) By Dirac

109. Every particle has a corresponding antiparticle with:
- (A) The same mass
- (B) Different mass
- (C) Opposite charge
- (D) Same energy
- (E) Both (A) and (C)

110. Lawrence Berkeley Laboratory is known also for the:
- (A) Discovery of positron
- (B) Annihilation of proton and antiproton
- (C) Annihilation of electron and positron
- (D) Discovery of electron
- (E) None of these

WAVE NATURE OF PARTICLE, AND WAVE PARTICLE DUALITY

111. Particles should also possess wave like properties. This was suggested by:
- (A) Dirac in 1928
- (B) Anderson in 1932
- (C) de Broglie in 1924
- (D) Heisenberg in 1932
- (E) None of these

112. The measurable range of wavelength associated with particle waves is:
- (A) Greater than 10^{-10} m
- (B) Greater than 1Å
- (C) Less than 10^{-10} m
- (D) Between 10^{-10}
- (E) Both (A) and (B)

113. The experimental evidence of wave nature of electrons was provided by:
- (A) Davisson
- (B) Germer
- (C) Dirac
- (D) Both (A) and (B
- (E) Both (B) and (C)

114. Davisson and Germer used in their experiment:
- (A) Nickel crystal
- (B) Electron gun
- (C) Detector
- (D) All of these
- (E) None of these

115. Tick the correct equation in case of Davisson and Germer experiment:
- (A) $\frac{1}{2}mv^2 = Ve$
- (B) $mv = \sqrt{2meV}$

(C) $\lambda = \frac{h}{\sqrt{2meV}}$ (D) All of these
(E) None of these

116. Wavelength associated with a material particle of mass m moving with a velocity v is given by the equation:
(A) $\lambda = \frac{mv}{h}$ (B) $\lambda = \frac{h}{mv}$
(C) $\lambda = \frac{h}{2mv}$ (D) $\lambda = \frac{2h}{mv}$
(E) $\lambda = \frac{3h}{mv}$

117. For first order diffraction of electrons from Nickel surface ($d = 10^{-10}$ m) at glancing angle of 65° carries waves of the order of:
(A) 10^{-10} m (B) 10^{-20} m
(C) 10^{-25} m (D) 10^{-30} m
(E) None of these

118. Diffraction pattern has been observed with:
(A) Protons (B) Neutrons
(C) Hydrogen atom (D) Helium atom
(E) All of these

119. Prince de Broglie was awarded Nobel Prize for his work on:
(A) Photoelectric effect (B) Pair production
(C) Dual nature of particles (D) Experimental verification of wave nature of particles
(E) None of these

120. The Nobel Prize was awarded for the experimental confirmation of wave nature of particles to:
(A) Davisson and Germer (B) Germer and G. P Thomson
(C) Davisson and G.P Thomson (D) Germer and de Broglie
(E) None of these

121. Wave nature of light was confirmed by:
(A) Photoelectric effect (B) Interference
(C) Both (A) and (B) (D) Diffraction
(E) Both (B) and (D)

122. The wavelength associated with a particle of 6.63 grams moving with a speed of 10 ms^{-1} is of the order of:
(A) 10^{-32} m (B) 10^{-23} m
(C) 10^{-13} m (D) 10^{-3} m
(E) None of these

123. The wavelength associated with an electron possessing linear momentum of 6.63×10^{-24} Ns is of the order of:
(A) 10^{10} m (B) 10^{-20} m
(C) 10^{-10} m (D) 2Å
(E) 10^{-30} m

124. Most energetic particles have:
(A) Extremely large de Broglie wavelengths
(B) Extremely small de Broglie wavelengths
(C) Large de Broglie wavelengths
(D) de Broglie wavelengths of intermediate range
(E) None of these

125. The basic concept used in the construction of an electron microscope is:
(A) Particle nature of waves (B) W[illegible] nature of [illegible]articles
(C) Both (A) and (B) (D) [illegible]
(E) None of above

126. The de Broglie wave associated with electrons used in el[illegible]
(A) One hundred times shorter than that of vis[illegible]
(B) One hundred times greater than that of [illegible]

(C) Thousands time greater than that of visible light
(D) Any of above
(E) Shorter than infrared light waves

127. In electron microscope, we use:
(A) Optical lenses
(B) Concave and convex mirrors
(C) Electric fields
(D) Magnetic fields
(E) Both (C) and (D)

128. The range of the voltages applied to accelerate electrons to high energies (in an electron microscope) is:
(A) 30 kV to several mega volts
(B) 30 V to several kilovolts
(C) 30 μV to several MV
(D) Below 30 V
(E) None of these

129. With a 50 kV electron microscope, it is possible to obtain a resolution of:
(A) 0.5 mm to 1 mm
(B) 0.5 mm to 1 mm
(C) 0.5 nm to 1 nm
(D) 0.5 cm to 1 cm
(E) None of these

130. The magnetic conducting lens concentrates the electron beam from:
(A) Specimen to electron gun
(B) Electron gun to specimen
(C) Specimen to screen
(D) Electron gun to screen
(E) Screen to electron gun

131. A three dimensional image of a good quality can be achieved by:
(A) Optical microscope
(B) Electron microscope
(C) Scanning electron microscope
(D) Any of these
(E) None of these

132. The concept of wave-particle duality has been applied while inventing:
(A) Electron microscope
(B) Photocell
(C) NAVSTAR
(D) Apparatus used by Davisson and Germer
(E) None of these

UNCERTAINTY PRINCIPLE

133. The uncertainty in measurement was proposed by:
(A) Heisenberg in 1927
(B) Dirac in 1928
(C) de Broglie in 1929
(D) Anderson in 1932
(E) None of these

134. Uncertainty principle was stated by:
(A) Dirac
(B) de Broglie
(C) Heisenberg
(D) Anderson
(E) Bohr

135. Uncertainty principle states that:
(A) $\Delta x \, \Delta p \approx h$
(B) $\Delta E - \Delta t \approx 2\pi h$
(C) $\Delta x \, \Delta E \approx h$
(D) $\Delta E \, \Delta p \approx h$
(E) None of these

136. Uncertainty in a measurement due to wave-particle duality is:
(A) Prominent for microscopic particles
(B) Prominent for macroscopic particles
(C) Negligible for macroscopic particles
(D) Both (A) and (B)
(E) Both (A) and (C)

137. The quantities of the following pair have the same units:
(A) Planck's constant and linear momentum
(B) Torque and power
(C) Angular momentum and Planck's constant
(D) Torque and moment arm
(E) Planck's constant and height h

138. When a photon strikes an electron, we will be able to determine the position of the electron within:
(A) One wavelength of the light used
(B) Two wavelength of the light being used
(C) Size of the electron

(D) Size of the photon
(E) All of these

139. We must use light of short wavelength in order to observe the position of the electron:
(A) With less uncertainty
(B) With minimized diffraction effect
(C) With maximum uncertainty
(D) Both (A) and (B)
(E) Both (A) and (C)

140. By using light of short wavelength:
(A) Position of electron is measured with less uncertainty
(B) Momentum measurement of electron becomes less precise
(C) Position measurement of electron becomes more precise
(D) All are true
(E) None is true

ANSWERS

1.	B	2.	D	3.	B	4.	E
5.	D	6.	B	7.	C	8.	A
9.	D	10.	B	11.	A	12.	D
13.	D	14.	D	15.	A	16.	A
17.	D	18.	E	19.	D	20.	A
21.	B	22.	B	23.	E	24.	B
25.	C	26.	B	27.	A	28.	E
29.	E	30.	D	31.	C	32.	A
33.	D	34.	E	35.	B	36.	B
37.	D	38.	C	39.	A	40.	C
41.	A	42.	D	43.	B	44.	E
45.	E	46.	C	47.	B	48.	E
49.	E	50.	A	51.	D	52.	E
53.	B	54.	B	55.	D	56.	C
57.	B	58.	D	59.	A	60.	C
61.	B	62.	E	63.	B	64.	D
65.	D	66.	B	67.	A	68.	B
69.	E	70.	B	71.	E	72.	D
73.	B	74.	B	75.	E	76.	E
77.	D	78.	B	79.	D	80.	C
81.	B	82.	A	83.	A	84.	B
85.	C	86.	E	87.	A	88.	C
89.	D	90.	B	91.	B	92.	A
93.	B	94.	A	95.	B	96.	D
97.	B	98.	A	99.	B	100.	C
101.	B	102.	C	103.	B	104.	E
105.	A	106.	E	107.	A	108.	D
109.	E	110.	B	111.	C	112.	E
113.	D	114.	D	115.	E	116.	B
117.	A	118.	E	119.	C	120.	C
121.	E	122.	A	123.	C	124.	B
125.	B	126.	C	127.	E	128.	A
129.	C	130.	B	131.	C	132.	A
133.	A	134.	C	135.	A	136.	E
137.	C	138.	A	139.	D	140.	D

****

Current Electricity

Select the correct answer and encircle it.

ELECTRIC CURRENT, SOURCES AND EFFECTS

1. **Most practical applications of electricity involve:**
   - (A) Charges at rest
   - (B) Charges in motion
   - (C) Electrons at rest
   - (D) Atoms in motion
   - (E) Molecules in motion
2. **The current that flows through the coil of a motor causes:**
   - (A) Its shaft to revolve
   - (B) Its brushes to rotate
   - (C) Motor to move
   - (D) Its shaft to rotate
   - (E) None of these
3. **SI unit of current describes the flow of charge at the rate of:**
   - (A) One ampere per second
   - (B) One coulomb per second
   - (C) One electron per second
   - (D) 6.25×10^{18} electrons per second
   - (E) Both (B) and (D)
4. **In case of metallic conductors, the charge carriers are:**
   - (A) Protons
   - (B) Electrons
   - (C) Antiprotons
   - (D) Positrons
   - (E) Both (A) and (B)
5. **The charge carriers in an electrolyte are:**
   - (A) Positive ions
   - (B) Negative ions
   - (C) Either (A) or (B)
   - (D) Both (A) and (B)
   - (E) Neither (A) nor (B)
6. **In gases, the charge carriers are:**
   - (A) Electrons
   - (B) Positive ions
   - (C) Negative ions
   - (D) Both (A) and (C)
   - (E) Both (A) and (B)
7. **The conventional current is the name given to current due to flow of:**
   - (A) Positrons
   - (B) Positive charges
   - (C) Negative charges
   - (D) Both (A) and (C)
   - (E) None of these
8. **A current of 1 ampere is passing through a conductor. The charge passing through it in half a minute is:**
   - (A) One Coulomb
   - (B) 0.5 Coulomb
   - (C) 30 Coulombs
   - (D) 2 Coulombs
   - (E) None of these
9. **The positive charge moving in one direction is equivalent in all external ·**
   - (A) Negative charge moving in the same direction.
   - (B) Positive charge moving in the opposite direction.
   - (C) Negative charge moving in the opposite direction.
   - (D) Positive charge moving in the same direction.
   - (E) None of these
10. **In a metal, the valence electrons are:**
    - (A) Attached to individual atoms
    - (B) Not attached to individual atoms
    - (C) Free to move within the metal

(D) Both (A) and (C)
(E) Both (B) and (C)

11. The free electrons in metals:
(A) Are in random motion and their speed depends upon temperature.
(B) Move in a particular direction.
(C) Move with speed of light.
(D) Move such that their speed does not depend upon temperature.
(E) None of these

12. The rate at which the free electrons pass through any section of a metallic wire from right to left is:
(A) Greater than the speed at which they pass from left to right
(B) Less than the speed at which they pass from left to right
(C) The same at which they pass from left to right
(D) Any of above
(E) None of these

13. If the ends of a wire are connected to a battery, an electric field E will be set up at:
(A) The ends of the wire only
(B) Mid point of the wire only
(C) Every point within the wire
(D) At nodes only
(E) None of these

14. The magnitude of drift velocity is of the order of:
(A) 10^{-6} ms^{-1} (B) 10^{-3} ms^{-1}
(C) 10^{3} ms^{-1} (D) 10^{6} ms^{-1}
(E) None of these

15. The term drift velocity is used when the ends of a wire are:
(A) Connected to a laser source
(B) Connected to a voltage source
(C) Not connected to a voltage source
(D) At different values of potential
(E) Both (B) and (D)

16. When a constant potential difference is applied across the conductor, the drift velocity of electrons:
(A) Increases (B) Decreases
(C) Remains constant (D) Either of these
(E) None of these

17. When resistance of a current carrying wire increases due to rise in temperature, the drift velocity of electrons:
(A) Decreases (B) Increases
(C) Remains constant (D) Either of these
(E) None of these

18. The effects of bends in a wire on its electrical resistance are:
(A) Zero (B) Much larger
(C) Larger (D) Smaller
(E) None of these

19. An electric field is generated along the wire when:
(A) Its resistance is very high
(B) A constant potential is maintained across the wire
(C) Net current through the wire is zero
(D) A constant potential difference is main[illegible]

(E) Either (A) or (D)

20. 1.0×10^7 electrons pass through a conductor in certain interval of time. The amount of charge will be:
(A) 1.6×10^{-12} Coulomb (B) 1.6×10^{-26} Coulomb
(C) 6.0×10^{25} Coulomb (D) 1.6×10^{26} Coulomb
(E) None of these

21. The amount of charge passing through a wire in 1.0 μs is 1.6×10^{-12} Coulomb. The current flowing through the wire is:
(A) 1.6×10^{-6} amp (B) 1.6×10^{-18} amp
(C) 1.6 micro amp (D) Either (A) or (C)
(E) Either (A) or (B)

22. The amount of charge passing through a wire in certain interval of time is 1.6 pico coulombs. The number of electrons are then:
(A) 10^7 (B) 10^{15}
(C) 10^{10} (D) 10^{16}
(E) None of these

23. In order to have a constant current through a wire, the potential difference across its ends should:
(A) Be zero (B) Be maintained constant
(C) Goes on increasing (D) Go on decreasing
(E) Both (A) and (D)

24. When two spherical conducting balls at different potentials are joined by a metallic wire, after some time:
(A) Both the conductors are at the same potential
(B) Potential difference across the conductors remain constant
(C) Potential difference across the conductors becomes zero
(D) Both (A) and (B)
(E) Both (A) and (C)

25. The example/s of non-electrical energy is/are:
(A) Chemical energy (B) Mechanical energy
(C) Heat energy (D) Both (A) and (B)
(E) All of these

26. Conversion of chemical energy to electrical energy can be achieved by:
(A) Primary cell (B) Secondary cell
(C) Both (A) and (B) (D) Photovoltaic cell
(E) Solar cell

27. The device which can convert heat energy into electrical energy is called:
(A) Thermistor (B) Thermometer
(C) Thermostat (D) Thermocouple
(E) Both (C) and (D)

28. When two spherical conducting balls at different potentials are joined by a metallic wire, the current starts:
(A) Decreasing from zero to maximum
(B) Increasing from zero to maximum
(C) Decreasing from maximum to zero
(D) Increasing from maximum to zero
(E) Both (A) and (D)

29. The obvious effect/s of current is/are:
(A) Heating effect (B) Magnetic effect
(C) Chemical effect (D) Both (B) and (C)

(E) All of these

30. As the current flows through the wire:
(A) It generates heat in the wire
(B) It produces sound in the wire
(C) Resistance of the wire decreases
(D) Voltage across the ends is increased
(E) None of these

31. Heat (H) produced in the wire of resistance R in time t when a current I is passed through it, is given by:
(A) $H = IR^2t$
(B) $H = IRt^2$
(C) $H = I^2Rt$
(D) $H = I^2R/t$
(E) None of these

32. Heating effect of current is utilized in:
(A) Electric motor
(B) Electric toaster
(C) Electroplating
(D) Electric kettle
(E) Both (B) and (D)

33. The passage of current is accompanied by a magnetic field in the surrounding space:
(A) Always accompanied
(B) Sometimes accompanied
(C) Never accompanied
(D) Any of above
(E) None of these

34. The strength of magnetic field at certain points around a wire depends upon:
(A) Value of current passing
(B) Distance from the current element
(C) Colour of the material
(D) Both (A) and (B)
(E) Both (B) and (C)

35. Magnetic effect of current is used:
(A) In electric motor
(B) To detect current
(C) To measure current
(D) All of these
(E) None of these

36. The magnitude of chemical effects depends upon:
(A) Nature of the liquid
(B) Quantity of electricity passed through the liquid
(C) Colour of the liquid
(D) Both (A) and (C)
(E) Both (A) and (B)

37. Two dissimilar metals joined at their ends kept at constant temperature constitute:
(A) Cell
(B) Voltmeter
(C) Thermocouple
(D) Potentiometer
(E) None of these

38. Electrolysis is the study of conduction of electricity through:
(A) Solids
(B) Liquids
(C) Gases
(D) Plasma
(E) All of these

39. The vessel containing the two electrodes and certain liquid is known as:
(A) Voltmeter
(B) Electrolyte
(C) Voltameter
(D) Calorimeter
(E) Thermometer

40. The voltameter usually contains:
(A) Water only

(B) Dilute solution of $CuSO_4$
(C) $CuSO_4$ in solid form
(D) Phosphorous
(E) None of these

41. The current through a wire is defined as:
(A) The rate at which current passes a point.
(B) The rate of transfer of charge through a circuit.
(C) The amount of charge passing a point per unit time.
(D) Both (A) and (B)
(E) Both (B) and (C)

42. Copper sulphate is dissociated into Cu^{++} and SO_4^{--} ions when it is:
(A) In solution form
(B) In solid form
(C) In gaseous form
(D) Both (A) and (C)
(E) None of these

43. During electrolysis process (using $CuSO_4$) density of $CuSO_4$ solution:
(A) Increases
(B) Decreases
(C) Remains unaltered
(D) Any of above
(E) None of these

44. The practical unit of current is:
(A) Ampere
(B) Ohm
(C) Coulomb
(D) Volt
(E) None of these

45. If the resistance of the conductor is increased, then current will:
(A) Increase
(B) Decrease
(C) Remain the same
(D) First increase and then decrease
(E) None of these

OHM'S LAW, RESISTANCE, RESISTIVITY

46. The resistance of a conductor depends upon:
(A) Nature of the conductor
(B) Dimensions of the conductor
(C) Physical state of the conductor
(D) Both (A) and (B)
(E) All of them

47. The unit of resistance is:
(A) Ampere
(B) Volt
(C) Ohm
(D) Coulomb
(E) Metre

48. Mathematical form of Ohm's law is:
(A) $I = VR$
(B) $I = \frac{V}{R}$
(C) $V = IR$
(D) $R = VI$
(E) Both (B) and (C)

49. A sample of a conductor is said to obey Ohm's law if graph between V and I is:
(A) Straight line
(B) Curve
(C) Parabola
(D) Either (A) or (B)
(E) Either (B) or (C)

50. The current in a light bulb rises to a maximum almost at the instant the bulb is turned on the current then decreases. This is because:
(A) Temperature of the filament rises
(B) Resistance increases

(C) Resistance decreases
(D) Both (A) and (B)
(E) Both (A) and (C)

51. **The resistances of 2, 3, 4Ω are provided. Their equivalent resistance will be the minimum when they are connected:**
(A) In series
(B) In parallel
(C) In series and in parallel
(D) Any of above
(E) None of these

52. **Example/s of a non-ohmic device is:**
(A) Filament bulb
(B) Semiconductor diode
(C) A current carrying wire with no change in temperature
(D) Both (A) and (B)
(E) Both (B) and (C)

53. **If V – I graph is non-linear such that the change in current becomes less for the same rise in potential difference, then it means that with the rise in P.D., the temperature of the wire:**
(A) Is rising
(B) Is falling
(C) Remains constant
(D) Either (A) or (C)
(E) None of these

54. **Resistance of a wire is:**
(A) Directly proportional to its length
(B) Directly proportional to its area
(C) Inversely proportional to its area
(D) Both (A) and (C)
(E) Both (A) and (B)

55. **The resistivity of a material of the wire depends upon:**
(A) Length of the wire
(B) Resistance of the wire
(C) Area of cross-section
(D) Material of wire
(E) All of these

56. **Three resistances each of 3Ω are connected in parallel. Their equivalent resistance is:**
(A) 9Ω
(B) 0.66Ω
(C) 1Ω
(D) 1/9Ω
(E) None of these

57. **The unit of resistivity is:**
(A) Ohm
(B) Ohm per metre
(C) Ohm-metre
(D) Metre per ohm
(E) Either (B) or (D)

58. **Conductance is:**
(A) Another name of resistance
(B) Reciprocal of resistance
(C) Measured in mho
(D) Measured in siemen
(E) All are true except A

59. **Resistance can be measured in:**
(A) VA^{-1}
(B) AV^{-1}
(C) JC^{-1}
(D) CJ^{-1}
(E) AJ^{-1}

60. **Conductivity is reciprocal of:**
(A) Resistivity and measured in ohm-metre
(B) Resistance and measured in mho
(C) Resistivity and measured in mho-m^{-1}

(D) Resistivity and measured in ohm^{-1}-m^{-1}
(E) Both (C) and (D)

61. The best conductor is:
(A) Silver
(B) Copper
(C) Aluminium
(D) Both (B) and (C)
(E) None of them

62. Most electric wires are made of copper because copper is:
(A) The best conductor
(B) Good conductor
(C) Comparatively cheaper
(D) Comparatively lighter
(E) Both (B) and (C)

63. Temperature coefficient of resistance is defined as:
(A) Change in resistance per degree centigrade
(B) Change in resistance per kelvin
(C) Fractional change in resistance per degree Fahrenheit
(D) Fractional change in resistance per kelvin
(E) Either (A) or (C)

64. The value of resistivity is the least for:
(A) Copper
(B) Aluminium
(C) Silver
(D) Tungsten
(E) Iron

65. Resistance decreases with increase in temperature in case of:
(A) Germanium
(B) Carbon
(C) Silicon
(D) Both (A) and (C)
(E) All of these

66. Which of the following has/have negative temperature coefficient of resistance?
(A) Silicon
(B) Copper
(C) Silver
(D) Iron
(E) Both (B) and (C)

67. Negative temperature coefficient of resistance means that:
(A) Resistance increases with increase in temperature
(B) Resistance increases with decrease in temperature
(C) Resistance decreases with increase in temperature
(D) Resistance decreases with decrease in temperature
(E) Both (B) and (C)

68. Ohm-centimetre is the unit of:
(A) Resistance
(B) Specific conductance
(C) Specific resistance
(D) Conductance
(E) None of these

69. A battery of 50 volts is attached to a circuit containing resistances of 5Ω, 10Ω, and 1[illegible] arranged in series. The current in the circuit is:
(A) 2 amps
(B) 5 amps
(C) 10 amps
(D) 20 amps
(E) None of these

70. Which of the following substances has got positive temperature coefficient of resistance?
(A) Carbon
(B) Germanium
(C) Silicon
(D) Aluminium
(E) None of these

COLOUR CODE, RHEOSTAT, THERMISTOR

71. Colour code of carbon resistances consists of:
(A) Two bands read from right to left

(B) Three bands read from right to left
(C) Four bands read from left to right
(D) Four bands read from right to left
(E) None is correct

72. The third band of the colour code:
(A) Gives the number of zeroes
(B) Is decimal multiplier
(C) Gives the resistance tolerance
(D) Gives the third digit
(E) Both (A) and (B)

73. The fourth band is a:
(A) Silver band (B) Red band
(C) Gold band (D) Either (A) or (C)
(E) Either (A) or (B)

74. Silver band indicates tolerance of:
(A) 10% (B) ±5%
(C) ±20% (D) 20%
(E) ±10%

75. Gold band shows a tolerance of:
(A) 10% (B) ±5%
(C) ±20% (D) 20%
(E) ±10%

76. If there is no fourth band, tolerance is indicated as:
(A) 10% (B) ±5%
(C) ±20% (D) 20%
(E) ±10%

77. A 1000Ω resistor with silver band as fourth band will have an actual resistance anywhere between:
(A) 950 Ω and 1050 Ω (B) 800 Ω and 1200 Ω
(C) 980 Ω and 1020 Ω (D) 900 Ω and 1100 Ω
(E) None of these

78. The wire used in the construction of a rheostat is of the material:
(A) Manganin (B) Iron
(C) Platinum (D) Gold
(E) Both (B) and (C)

79. A rheostat can be used:
(A) As variable resistor (B) As potential divider
(C) For varying the current (D) All of these
(E) None of these

80. To use a rheostat as variable resistor, the terminals which are inserted in the circuit are:
(A) Both the fixed terminals A and B
(B) Fixed terminal A and the sliding terminal C
(C) Fixed terminal B and the sliding terminal C
(D) Either answer A or answer B
(E) Both answers B and C

81. Less value of temperature coefficient of resistance means:
(A) More fractional change in resistance per kelvin
(B) Less fractional change in resistance per k
(C) Much larger fractional change in resistance pe
(D) Any of above

(E) None of above

82. **When the rheostat is used as variable resistor, the shifting of the sliding contact to one side causes:**
(A) The change in the current
(B) The change in resistance
(C) The change in temperature
(D) All these changes
(E) No change at all

83. **When rheostat is used as potential divider, the shifting of the sliding contact to one side causes:**
(A) The change in the current
(B) The change in the output voltage
(C) The change in the output resistance
(D) Both (B) and (C)
(E) All these changes

84. **A thermistor is a resistor which is:**
(A) Light sensitive (B) Heat sensitive
(C) Sound sensitive (D) All of these
(E) None of these

85. **The types of thermistor having negative values of temperature coefficient of resistance in comparison to those having positive values are:**
(A) Equal in number
(B) In a ratio of more to less
(C) In the ratio of less to more
(D) In the ratio of lesser to more
(E) None of these

86. **"Physical state" in the statement of Ohm's law means:**
(A) Temperature of the conductor
(B) Pressure on the conductor
(C) Length of the conductor
(D) Area of cross-section
(E) Material of the conductor

87. **Thermistors are made from mixtures of metallic oxides of:**
(A) Manganese (B) Gold
(C) Mercury (D) Carbon
(E) Silicon

88. **If 2V are needed to cause a current of 0.2 A to flow in a conductor, its resistance is:**
(A) 0.1Ω (B) 0.4Ω
(C) 1.0Ω (D) 10Ω
(E) None of these

89. **Thermistors are prepared under:**
(A) High pressure and low temperature
(B) High pressure and high temperature
(C) Low pressure and low temperature
(D) Low pressure and high temperature
(E) None of these

90. **Thermistors may be in the form of:**
(A) Beads (B) Rods
(C) Washers (D) Either of these
(E) Neither of above

91. **Thermistors with high negative temperature coefficient of resistance are very accurate for**

measuring:
(A) Low temperature especially near 10K
(B) Low temperature especially near –263K
(C) High temperature especially near 373 K
(D) High temperature especially near 0°C
(E) Both (A) and (B)

92. The resistivity of a 1m length of wire of iron as compared to the wire of same material of double the length is:
(A) Same (B) Smaller
(C) Greater (D) Much greater
(E) None of these

93. The reason to choose manganin in the construction of a rheostat is its:
(A) High temperature coefficient of resistance (α)
(B) Low value of α
(C) Much higher value of α
(D) High density
(E) None of these

94. A temperature sensor converts changes of temperature into:
(A) Sound signal (B) Electrical voltages
(C) Magnetic lines of force (D) Light signals
(E) None of these

95. In the construction of a standard rheostat, we use manganin, which is an alloy of:
(A) Cu, Au and Ni (B) Cu, Ni, Fe and Mn
(C) Ni and Fe (D) Cu, Ag and Fe
(E) None of these

POWER DISSIPATION, ELECTROMOTIVE FORCE AND TERMINAL P.D.

96. Work done is moving a charge ΔQ up through the potential difference V is given by:
(A) $V\Delta Q$ (B) $\Delta Q/V$
(C) $V/\Delta Q$ (D) $1/V\Delta Q$
(E) None of these

97. An automobile consumes energy at the rate of 60W on a 12V supply. How much charge passes through it in half a minute:
(A) 25 coulomb (B) 24 coulomb
(C) 21600 coulomb (D) 6 coulomb
(E) 150 coulomb

98. In a circuit containing only the battery and resistor R, the power supplied by the battery is:
(A) Reproduced by the resistor R
(B) Expended in resistor R
(C) Dissipated in the resistor R
(D) Both (A) and (B)
(E) Both (B) and (C)

99. Heat is produced in a conductor due to flow of current because:
(A) Its atoms are attracted towards each other
(B) Its atoms are repelled from each other
(C) Kinetic energy of its atoms increases
(D) Potential energy of its atoms increases
(E) None of these

100. The work done by a cell in moving 10 coulombs of charge ar... loop is 20 J. The emf of the cell is:
(A) 200 N

(C) 2 V (D) 0.5 V
(E) None of these

101. **The emf E of a source is the:**
(A) Energy supplied to all the charges by the cell
(B) Energy supplied by the cell to unit charge
(C) Force applied on different charges
(D) Work done on all the charges
(E) None of these

102. **Dissipated power can be calculated by:**
(A) $V \times I$ (B) $\frac{V^2}{R}$
(C) V^2R (D) I^2R
(E) All except one

103. **If V is expressed in volts and I in amperes, the power is expressed in:**
(A) Volt/ampere (B) $Watt^{-1}$
(C) Volt-ampere (D) Ampere/volt
(E) Both (A) and (C)

104. **Filament resistance in a 500W, 200V light bulb is:**
(A) 80Ω (B) $10^5\Omega$
(C) 2.5Ω (D) 0.4Ω
(E) None of these

105. **The emf of a source is:**
(A) A force and measured in newton
(B) Not a force and not measured in newtons
(C) Not a force and measured in joule/coulomb
(D) Not a force and measured in volt
(E) All are true except one

106. **The energy supplied by the cell to the charge carries is derived from:**
(A) Conversion of chemical into electrical energy
(B) Inside the cell
(C) Conversion of electrical into chemical energy
(D) Both (A) and (B)
(E) Both (A) and (C)

107. **When the current is being drawn from the battery:**
(A) $V = E - Ir$ is applied (B) $V = E + Ir$ is applied
(C) It is being discharged (D) Both (A) and (C)
(E) Both (B) and (C)

108. **When current is drawn from a cell, its terminal P.D. and emf are:**
(A) Same (B) Both zero
(C) Different (D) Equal in magnitude
(E) None of these

109. **The resistance present between the two electrodes of the cell is due to:**
(A) An electrolyte present between them
(B) Electrodes themselves
(C) The material of vessel
(D) Connecting wires
(E) None of these

110. **When a battery is being charged, its terminal P.D. is:**
(A) Equal to its emf (B) Less than its emf
(C) Greater than its emf (D) Much less than its emf

(E) None of them

111. The emf is measured in:

(A) Newton (B) Volt
(C) J/C (D) Both (A) and (B)
(E) Both (B) and (C)

112. The unit of energy is:

(A) Coulomb × Volt (B) Watt × Second
(C) Newton × Metre (D) Both (A) and (B)
(E) All of these

113. The energy given out by a 60 W bulb in 30 minutes is:

(A) 900 J (B) 1800 J
(C) 30 watt-hour (D) 1.08×10^5 J
(E) Both (C) and (D)

114. The loss of electrical energy per second is called:

(A) Work (B) Energy dissipated
(C) Power dissipated (D) All of these
(E) None of these

115. The quantity having the same unit as that of emf is:

(A) Force (B) Energy
(C) Potential difference (D) Current
(E) Charge

116. In a circuit of a source of emf and the load resistance, the maximum power is delivered to the load when the internal resistance of the source is:

(A) Smaller than the load (B) Greater than the load
(C) Is equal to the load (D) Either (A) or (B)
(E) None of these

117. A current of 5A is passed through a conductor of 10 ohms resistance for a period of 10 seconds. The heat produced in joules will be:

(A) 2500 (B) 500
(C) 5000 (D) 50000
(E) None of these

118. Two bulbs, one 40 watt and another 60 watt are joined in series across the 220 volt mains:

(A) The current in two bulbs will pass in the ratio of their resistances.
(B) The current in the two bulbs will pass in the ratio of their reciprocal resistances.
(C) Same current will pass in both the bulbs.
(D) More current will pass in the first bulb than in the second bulb.
(E) None of these

119. When the cell is in open circuit (i.e., no current is being drawn from the cell) the potential difference between the two plates is known as:

(A) Resistance (B) Specific resistance
(C) Electromotive force (D) Resistivity
(E) None of these

KIRCHHOFF'S RULES, WHEAT STONE BRIDGE, POTENTIOMETER

120. According to a convention, a current flowing:

(A) Towards a point is taken as negative
(B) Towards a point is taken as positive
(C) Away from a point is taken as negative
(D) Both (A) and (C)
(E) Both (B) and (C)

121. Kirchhoff's first rule is also called:

(A) Loop rule (B) Thumb rule
(C) Point rule (D) Right hand rule
(E) None of these

122. **Kirchhoff's first rule is a manifestation of law of conservation of:**
(A) Mass (B) Energy
(C) Charge (D) Kinetic energy
(E) None of these

123. **If the source of emf is traversed from negative to positive terminal, the potential change is:**
(A) Negative (B) Positive
(C) Zero (D) Either of these
(E) None of these

124. **Algebraic sum of all the voltage changes in a closed circuit must be equal to:**
(A) 10 (B) 20
(C) Zero (D) 100
(E) None of these

125. **Kirchhoff's second rule is a manifestation of law of conservation of:**
(A) Mass (B) Energy
(C) Charge (D) Kinetic energy
(E) None of these

126. **Potential difference can be measured by:**
(A) Voltmeter (B) Potentiometer
(C) CRO (D) Both (A) and (B)
(E) All of these

127. **As compared to the circuit resistance across which the voltmeter is connected, its resistance should be:**
(A) Small (B) Large
(C) Equal (D) Much smaller
(E) Any of these

128. **No deflection in the galvanometer in a balanced wheat-stone bridge means that the terminals of galvanometer are at:**
(A) Same potential (B) Different potentials
(C) Zero potential (D) Both (A) and (C)
(E) None of these

129. **A voltmeter can read the correct potential difference only when the current drawn by it from the circuit is:**
(A) Zero (B) Greater
(C) Much smaller (D) Smaller
(E) None of these

130. **An ideal voltmeter has:**
(A) Zero resistance (B) Small resistance
(C) Large resistance (D) Infinite resistance
(E) Both (A) and (B)

131. **Which instrument is expensive and difficult to use?**
(A) Voltmeter (B) Potentiometer
(C) CRO (D) Both (B) and (C)
(E) Both (A) and (B)

132. **The unknown emf E_x can be found by using potentiometer by the formula:**
(A) $E_x = E\frac{R}{r}$ (B) $E_x = E\frac{r}{R}$

(C) $E_x = E\frac{\ell}{L}$

(D) Both (B) and (C)

(E) Both (A) and (C)

ANSWERS

1.	B	2.	D	3.	E	4.	B
5.	D	6.	E	7.	B	8.	C
9.	B	10.	E	11.	A	12.	C
13.	C	14.	B	15.	E	16.	C
17.	A	18.	A	19.	D	20.	A
21.	D	22.	A	23.	B	24.	E
25.	E	26.	C	27.	D	28.	C
29.	E	30.	A	31.	C	32.	E
33.	A	34.	D	35.	D	36.	E
37.	C	38.	B	39.	C	40.	B
41.	E	42.	A	43.	C	44.	A
45.	B	46.	E	47.	C	48.	E
49.	A	50.	D	51.	B	52.	D
53.	A	54.	D	55.	D	56.	C
57.	C	58.	E	59.	A	60.	E
61.	A	62.	E	63.	D	64.	C
65.	E	66.	A	67.	E	68.	C
69.	A	70.	D	71.	C	72.	E
73.	D	74.	E	75.	B	76.	C
77.	D	78.	A	79.	D	80.	E
81.	B	82.	D	83.	D	84.	B
85.	C	86.	A	87.	A	88.	D
89.	B	90.	D	91.	E	92.	A
93.	B	94.	B	95.	B	96.	A
97.	E	98.	E	99.	C	100.	C
101.	B	102.	E	103.	C	104.	A
105.	E	106.	D	107.	D	108.	C
109.	A	110.	C	111.	E	112.	E
113.	E	114.	C	115.	C	116.	C
117.	A	118.	C	119.	C	120.	E
121.	C	122.	C	123.	B	124.	C
125.	B	126.	E	127.	B	128.	A
129.	A	130.	D	131.	C	132.	D

Forces

LINEAR MOTION

1. The shortest distance between two points directed from its initial point to final point is called:
   (A) Velocity (B) Displacement
   (C) Speed (D) Distance

2. A body moving with an acceleration of 5 m/sec^2 started with velocity of 10 m/sec. What will be the distance traversed in 10 seconds?
   (A) 150 m (B) 250 m
   (C) 350 m (D) 400 m

3. A ball is dropped from a height of 4.2 metres. To what height will it rise if there is no loss of KE after rebounding?
   (A) 4.2 m (B) 8.4 m
   (C) 12.6 m (D) None of these

4. The dimension of linear inertia is:
   (A) MLT^2 (B) ML^oT^{-2}
   (C) ML^oT^o (D) MLT^{-1}

5. Which one of the following is dimensionless:
   (A) Acceleration (B) Velocity
   (C) Density (D) Angle

6. When brakes are applied to a fast moving car, the passengers will be thrown:
   (A) Forward (B) Backward
   (C) Downward (D) None of these

7. A body of mass 5 kg is acted upon by a constant force of 20 N for 7 seconds. The total change in momentum will be:
   (A) 10 NS (B) 100 NS
   (C) 140 NS (D) 200 NS

8. A body is moving with constant velocity of 10 m/sec in the north-east direction. Then its acceleration will be:
   (A) 10 m/sec^2 (B) 20 m/sec^2
   (C) 30 m/sec^2 (D) Zero

9. The magnitude of the force producing an acceleration of 10 m/sec^2 in a body of mass 500 grams is:
   (A) 3 N (B) 4 N
   (C) 5 N (D) 6 N

10. If the velocity time graph is a straight line parallel to time axis, then it means that:
    (A) The body is moving with uniform velocity (B) The body is moving with uniform acceleration
    (C) The body is at rest. (D) None of above.

11. In the above figures, tell which set of graphs shows that a body is moving with uniform velocity?
    (A) (i) and (ii) (B) (ii) and (iii)
    (C) (i) and (iii) (D) (iii) and (iv)

12. Slope of velocity-time graph represents:
    (A) Acceleration (B) Speed
    (C) Torque (D) Work

13. A certain force gives an acceleration of 2 m/sec^2 to a body of mass 5 kg. The same force would give a 20 kg object an acceleration of:
    (A) 0.5 m/sec^2 (B) 5 m/sec^2
    (C) 1.5 m/sec^2 (D) 9.8 m/sec^2

14. A dirty carpet is to be cleaned by heating. This is in accordance with ______ law of motion.
    (A) First (B) Second
    (C) Third (D) None of these

15. Swimming becomes possible because of ______ law of motion.
    (A) First (B) Second
    (C) Third (D) None of these

16. The direction of acceleration of a body moving in a straight line is:
    (A) Along $\Delta\vec{V}$ (B) Perpendicular to $\Delta\vec{V}$
    (C) Towards origin (D) None of these

17. Bodies which falls freely under gravity provides good example of motion under:
    (A) Uniform acceleration (B) Non-uniform acceleration
    (C) Uniform velocity (D) None of these

18. ☛ An object is dropped from a height of 100 m. Its velocity at the moment it touches the ground is:
    (A) 100 m/sec (B) 140 m/sec
    (C) 1960 m/sec (D) 196 m/sec

19. Force is a:
    (A) Scalar quantity (B) Base quantity
    (C) Derived quantity (D) None of these

20. One newton is a force that produces an acceleration of 0.5 m/sec^2 in a body of mass:
    (A) 2 kg (B) 3 kg
    (C) 4 kg (D) 8 kg

21. The time rate of change of displacement is called:
    (A) Time (B) Acceleration
    (C) Speed (D) Velocity

22. If a distance-time graph is a straight line parallel to time-axis, then it means that:
    (A) The body is moving with uniform velocity (B) The body is moving with uniform acceleration
    (C) The body is at rest (D) None of these

23. Consult page 50 of your text and tick the correct statement:
    (A) Velocity of x-rays is greater than velocity of light (B) Velocity of light is less than velocity of radio waves
    (C) Velocity of light, x-rays and radio waves is the same (D) None of above is correct

24. Which is correct statement?
    (A) Speed of sound is 330 m/sec and speed of light is 3×10^5 Km/sec (B) Speed of sound is 3×10^8 m/sec and that of light is 330 m/sec
    (C) Speed of sound is greater than speed of light (D) None of above is correct

25. If the instantaneous velocity does not change, the body is said to be moving with:
    (A) Non-uniform velocity (B) Uniform velocity
    (C) Uniform acceleration (D) None of them

26. ☛ If the initial and final velocities of a moving body are 30 cm/sec and 3.70 m/sec, respectively, then the distance covered in 5 seconds will be:
    (A) 1 m (B) 2 m
    (C) 5 m (D) 10 m

27. The distance covered by a body in unit time is called:
    (A) Displacement (B) Speed
    (C) Velocity (D) Both B and C are correct

28. The decrease in velocity per unit time is called:

(A) Variable acceleration (B) Average acceleration
(C) Retardation (D) None of these

29. **When the total displacement is divided by total time taken, we get:**
(A) Velocity (B) Average speed
(C) Average velocity (D) None of these

30. **If slope of the velocity-time graph is zero for all points on the curve, then slope of the graph will be _______ and it will represent _______.**
(A) A curve, uniform velocity (B) A straight line parallel to time-axis, uniform velocity
(C) A straight line inclined at 45°, uniform acceleration (D) None of these

31. **A cricket ball is hit so that it travels straight up in air and it acquires 3 seconds to reach the maximum height. Its initial velocity is:**
(A) 20 m sec^{-1} (B) 25 m sec^{-1}
(C) 29.4 m sec^{-1} (D) None of these

32. **A body is thrown vertically upward with initial velocity of 9.8 m sec^{-1}. It will reach the height of:**
(A) 49.2 m (B) 29.4 m
(C) 9.8 m (D) 4.9 m

33. **If slope of velocity-time graph is a straight line such that $\tan \theta = 1$ at each point, the graph represents:**
(A) Uniform velocity (B) Variable acceleration
(C) Uniform acceleration (D) Both A and C are correct

34. **Distance covered by a freely falling body in the first second of its motion will be:**
(A) 4.9 m (B) 9.8 m
(C) 19.6 m (D) 29.4 m

35. **If the slope of velocity-time graph is a straight line such that $\tan \theta = 1$ at each point, then the straight line will be:**
(A) Parallel to time axis (B) Inclined at 45°
(C) Parallel to velocity axis (D) None of these

36. **The average acceleration of a body becomes its instantaneous acceleration when:**
(A) $\Delta\vec{V}$ approaches to zero (B) $\frac{\Delta\vec{V}}{\Delta t}$ approaches to zero
(C) Δt approaches to zero (D) None of these

37. **A ball is thrown up vertically above from the ground which then comes down. The time displacement graph is:**
(A) A straight line (B) Like that of trajectory of projectile
(C) An irregular-shaped curve (D) None of these

38. **A ball is thrown up vertically from the ground level. It completes its journey when it strikes the ground back in 4 seconds. It has travelled more distance in:**
(A) First second (B) Second second
(C) Third second (D) None of these

39. **In the above question, equal distances have been covered in:**
(A) 1^{st} and 2^{nd} second (B) 1^{st} and 3^{rd} second
(C) 2^{nd} and 4^{th} second (D) 1^{st} and 4^{th} second

40. **A body falling freely has:**
(A) Variable velocity (B) Uniform acceleration
(C) Both A and B are correct (D) Variable acceleration

41. **When $\Delta t \rightarrow 0$, the acceleration of a moving body is called:**
(A) Average acceleration (B) Instantaneous acceleration

(C) Uniform acceleration (D) None of these

42. If the acceleration of a body is negative, then slope of the velocity-time graph will be:
(A) Zero (B) Positive
(C) Negative (D) Infinity

43. If the acceleration of a body is not uniform, then velocity-time graph will be:
(A) Curve (B) Straight line
(C) Sphere (D) All of these

44. A car starts from rest with a uniform acceleration of 20 cm sec^{-2}. The distance covered by it in 10 seconds is:
(A) 400 m (B) 20 m
(C) 10 m (D) 1 m

45. A neutron takes 6 μ S to cover a distance of 3 metres. The average velocity of the neutron is:
(A) 0.5×10^{-6} m sec^{-1} (B) 0.5×10^{6} m sec^{-1}
(C) 0.5×10^{-8} m sec^{-1} (D) 1.8×10^{-6} m sec^{-1}

46. Motion of a body along Y-axis is:
(A) One dimension (B) Two dimensions
(C) Three dimensions (D) None of these

47. ☛ Acceleration of 1.5 m sec^{-2} expressed in km hr^{-2} is:
(A) 324 (B) 5.4
(C) 5400 (D) 19440

48. ☛ A train covers 90 km in half an hour. The time taken by it to travel 15 km will be:
(A) 20 minutes (B) 48 minutes
(C) 10 minutes (D) 5 minutes

49. ☛ A body starting from rest covers a distance of 0.45 km and acquires a velocity of 300 km/hr. Its acceleration will be:
(A) 0.092 m sec^{-2} (B) 0.5 m sec^{-2}
(C) 7.71 m sec^{-2} (D) 0.15 m sec^{-2}

50. A train starts from rest with a uniform acceleration of 10 cm sec^{-2}. Its velocity after one minute is:
(A) 60 m sec^{-1} (B) 6 m sec^{-1}
(C) 0.6 m sec^{-1} (D) 0.6 km sec^{-1}

51. Acceleration in a body is always produced in the direction of:
(A) Velocity (B) Weight
(C) Force (D) Both B and C

52. If force of friction is negligible, then acceleration of two freely falling objects of different masses is:
(A) Variable (B) The same
(C) Smaller acceleration for smaller mass (D) Both A and C are correct

53. Newton's first law is also called:
(A) Law of torque (B) Law of force
(C) Law of inertia (D) None of these

54. To produce same acceleration in the bodies of masses 5 kg and 10 kg, the force applied on the second body should be:
(A) Doubled (B) Halved
(C) Same as on the first body (D) None of these

55. Action and reaction of two bodies upon each other are:
(A) Equal in magnitude and in the same direction (B) Different in magnitude and opposite in direction
(C) Equal in magnitude and opposite in (D) None of these

56. When a moving car stops quickly, the driver moves ______ the wind shield.
(A) Backward away from
(B) Forward towards
(C) Neither backward nor forward direction
(D) None of these

57. If a gunman standing in a stationary boat in water fires the gun in a horizontal direction, the boat will:
(A) Spin around
(B) Move in the direction of target
(C) Move away from the target
(D) None of these

58. A car and a bus moving with the same KE are acted upon by the same retarding force, then:
(A) The car comes to rest in a comparatively shorter distance
(B) The bus comes to rest in a comparatively shorter distance
(C) Both come to rest covering equal distances
(D) None of these

59. For a fixed force, larger is the mass of a body:
(A) Smaller will be its acceleration
(B) Greater will be its acceleration
(C) Same will be its acceleration
(D) None of these

60. Newton's second law of motion is also called:
(A) Law of gravitation
(B) Law of inertia
(C) Law of acceleration
(D) None of these

61. ☛ When a climber reaches the top of a mountain:
(A) His weight is now greater
(B) His mass is now slightly smaller
(C) His weight is now slightly less
(D) None of these

62. A mass of 5,000 grams moves with an acceleration of 1,000 cm sec^{-2}. Force on it is:
(A) 10 N
(B) 50 N
(C) 2 N
(D) 15 N

MOMENTUM AND COLLISIONS

63. The product of force and time is called change in:
(A) Momentum
(B) Impulse
(C) Force
(D) Both A and B

64. Which of the following quantities is not a vector:
(A) Momentum
(B) Change in momentum
(C) Reaction
(D) None of these

65. The term impulse is used when the force applied on a body is:
(A) Not constant
(B) Constant
(C) Both A and B
(D) None of these

66. ☛ According to the law of conservation of momentum, $m_1v_1 - m_1v_1' =$ ______
(A) $m_2v_2 + m_2v_2'$
(B) $m_2v_2' - m_2v_2$
(C) $m_2v_2 - m_2v_2'$
(D) None of these

67. ☛ Force can also be defined as:
(A) Rate of change of momentum
(B) Product of mass per second and change in velocities
(C) Both A and B are correct
(D) None of these

68. ☛ When a bullet is fired by a gun, the gun moves backward with a:
(A) Velocity equal to that of bullet
(B) Velocity less than that of bullet
(C) Velocity greater than that of bullet
(D) None of these

69. Which of the following have some SI units?
(A) Force and momentum
(B) Impulse and momentum
(C) Force and impulse
(D) None of these

70. The law of conservation of linear momentum is valid for:
(A) Atoms only
(B) Molecules only

(C) Other systems only (D) All of them

71. **The relative speed of approach is always equal to relative speed of separation in:**
(A) Partial elastic collision (B) Perfectly elastic collision
(C) Inelastic collision (D) None of these

72. **If two bodies of equal masses moving in the same direction collide elastically, then their velocities:**
(A) Are added (B) Are subtracted
(C) Do not change (D) Are exchanged

73. **When a body of mass m moving with velocity v collides elastically with another body of same mass at rest, then after collision:**
(A) The first body comes to rest while the other body moves with velocity v (B) Both move with the same velocity v
(C) Both move with velocity $\frac{v}{2}$ (D) None of them

74. **If a body whose mass is much less than a body at rest collides with it elastically, then it bounces back with:**
(A) Same velocity (B) Double velocity
(C) Half of the velocity (D) None of these

75. **When the mass of the colliding body is much larger than the mass of the body at rest, its velocity after collision:**
(A) Becomes half (B) Becomes zero
(C) Remains same (D) Becomes double

76. **The collision in which KE is conserved but momentum is not conserved is called:**
(A) Elastic collision (B) Inelastic collision
(C) Any of these (D) None of these

77. **A force of 100 N acts on a body for 0.01 sec and changes its velocity from 10 m sec^{-1} to 20 m sec^{-1}. The amount of impulse will be:**
(A) 100 N sec (B) 50 N sec
(C) 10 N sec (D) 5 N sec

78. **Newton-second is SI unit of:**
(A) Impulse (B) Acceleration
(C) Torque (D) Angular momentum

79. **Two fast moving vehicles suffer head-on collision with a force of 100 N for an interval of 10^{-3} seconds. The impulse is:**
(A) 10^{-5} NS (B) 10^{-1} NS
(C) 10^{-3} NS (D) 10^{5} NS

80. **A collision in which total momentum as well as total energy is conserved is called:**
(A) Elastic collision (B) Inelastic collision
(C) Both A and B (D) None of above

81. **A heavy particle moving with 5 m/sec suffers an elastic collision with a light particle at rest. After collision, the velocity of light particle will be:**
(A) 5 m/sec (B) 10 m/sec
(C) 20 m/sec (D) Zero

82. **Which quantity has the same dimension as that of impulse?**
(A) KE (B) Power
(C) Momentum (D) Work

83. **When a number of bodies are such that they can exert force upon one another and no external agency exerts a force on them, they are said to form:**
(A) An inertial frame of reference (B) Non-inertial frame of reference
(C) A rectangle (D) An isolated system

84. ☛ A force of 100 N acts upon a body for five seconds. What will be the change in momentum?
(A) 200 NS (B) 500 Kg m/sec.
(C) 20 Kg m/sec (D) $\frac{1}{20}$ NS

85. The dimensional unit of impulse is:
(A) MLT (B) MLT^{-1}
(C) $ML^{-1}T^{-1}$ (D) $M^{-1}L^{-1}T^{-2}$

86. Change in momentum in one second is called:
(A) Impulse (B) Force
(C) Energy (D) Work

87. ☛ Suppose water comes out of a pipe at the rate of 3 kg per second and its velocity changes from 5 m/sec to zero on striking the wall perpendicularly. The force exerted on the wall is:
(A) 15 N (B) 8 N
(C) –2 N (D) 1.66 N

88. If V denotes volume of the liquid coming out of a pipe per second, v its velocity and A as area of the pipe, then the correct formula will be:
(A) $V = v \times A$ (B) $v = V \times A$
(C) $A = v \times V$ (D) None of these

89. When a bullet is fired from a rifle, the total momentum of the system after firing is:
(A) Equal to the momentum of the bullet only (B) Equal to the momentum of the rifle only
(C) Equal to the momentum of the system before firing (D) None of these

90. If m means mass of gases ejected per second from a rocket and v shows the change in velocity, then mv is named as:
(A) Force (B) Energy
(C) Work (D) Impulse

PROJECTILE MOTION

91. During the upward motion of the projectile, the vertical component of velocity:
(A) Decreases (B) Increases
(C) Remains constant (D) None of these

92. One ball is thrown horizontally while another similar ball is released as a free fall simultaneously from same height. The two balls will reach the ground:
(A) One after the other (B) At the same time
(C) At different times (D) None of these

93. In a projectile motion, the total time of flight is equal to:
(A) Twice the time to reach the highest point (B) The time to reach the highest point
(C) Half the time to reach the highest point (D) None of these

94. ☛ Range of the projectile is the same for the following pair of angles:
(A) 0° and 45° (B) 35° and 55°
(C) 15° and 60° (D) 30° and 75°

95. The horizontal range of a projectile depends upon:
(A) Initial velocity (B) Angle of projection
(C) Value of g (D) All of them

96. The vertical component of acceleration in the second half of a projectile motion:
(A) Has no relation with g (B) Is equal to g
(C) Is more than g (D) Is less than g

97. ☛ For any value of initial velocity, the minimum range of a projectile is obtained by throwing it

at an angle of:

(A) 45° (B) 40° or 50°
(C) 30° or 60° (D) 0° or 90°

98. **For maximum horizontal range, the angle of projection must be:**

(A) 0° (B) 45°
(C) 60° (D) 90°

99. ☛ **In a projectile motion, the maximum height reached equals the horizontal range. The angle of the projectile with the horizontal will be:**

(A) $\tan^{-1}\left(\frac{1}{4}\right)$ (B) $\tan^{-1}(1)$
(C) $\tan^{-1}(2)$ (D) $\tan^{-1}(4)$

100. **To improve the jumping record, a long jumper should:**

(A) Jump as high as possible (B) Jump at an angle of 45°
(C) Jump at an angle of 60° (D) None of these

101. **All along the trajectory of the projectile:**

(A) v_x remains constant but v_y varies (B) v_y remains constant but v_x varies
(C) Both components remain constant (D) None of the above

102. ☛ **At the highest point, we can claim that:**

(A) Resultant velocity is zero (B) Only horizontal component of velocity is zero
(C) Only v_y is zero (D) Nothing of above

103. **Select formulae for time of flight and maximum horizontal range:**

(A) $\frac{v_i^2 \sin 2\theta}{g}, \frac{v_i^2 \sin^2\theta}{2g}$ (B) $\frac{2v_i \sin\theta}{g}, \frac{v_i^2 \sin 2\theta}{g}$
(C) $\frac{2v_i \sin\theta}{g}, \frac{v_i^2 \sin^2\theta}{2g}$ (D) $\frac{2v_i \sin\theta}{g}, \frac{v_i^2}{g}$

104. **Maximum range travelled by a projectile is 100 km. The initial velocity of the projectile at a place where g = 10 m/sec² will be:**

(A) 100 m/sec (B) 1000 m/sec
(C) 10 km/sec (D) 100 km/hour

105. ☛ **The range of the projectile when launched at an angle of 15° with the horizontal is 1.5 km. What is the range when launching angle is 75°?**

(A) 1.5 km (B) 7.5 km
(C) 2.5 km (D) 3 km

106. **For the angles less than 45°, max. height and maximum horizontal range of the projectile are described as under:**

(A) Height is less, range is more (B) Height is less, range is also less
(C) Height is more, range is less (D) Height is more, range is also more

107. **Horizontal range will be same for two projectiles projected at different angles if sum of these angles is:**

(A) 45° (B) 90°
(C) 135° (D) 180°

108. **The path followed by the projectile is known as:**

(A) Cycle (B) Hyperbola
(C) Trajectory (D) Route

109. **A bomber drops its bomb when it is vertically above the target. It misses the target due to:**

(A) Horizontal component of velocity (B) Vertical compo[illegible]t of velocity
(C) Pull of gravity (D) None o[illegible]

110. **Motion of a projectile is:**

(A) Two dimensional (B) Three dimensional
(C) One dimensional (D) None of these

111. Maximum range of projectile is:

(A) $\frac{v_i^2}{2g}$ (B) $\frac{2v_i}{g}$
(C) $\frac{v_i^2}{g}$ (D) None of these

112. The vertical component, with which a projectile covers vertical distance, is minimum:

(A) At the point of projection (B) At the highest point of its trajectory
(C) At the landing point (D) None of these

ANSWERS

1.	B	2.	C	3.	A	4.	C
5.	D	6.	A	7.	C	8.	D
9.	C	10.	A	11.	D	12.	A
13.	A	14.	A	15.	C	16.	A
17.	A	18.	B	19.	C	20.	A
21.	D	22.	C	23.	C	24.	A
25.	B	26.	D	27.	B	28.	C
29.	C	30.	B	31.	C	32.	D
33.	C	34.	A	35.	B	36.	C
37.	B	38.	A	39.	D	40.	C
41.	B	42.	C	43.	A	44.	C
45.	B	46.	A	47.	D	48.	D
49.	C	50.	B	51.	C	52.	B
53.	C	54.	A	55.	C	56.	B
57.	C	58.	A	59.	A	60.	C
61.	C	62.	B	63.	D	64.	D
65.	A	66.	B	67.	C	68.	B
69.	B	70.	D	71.	B	72.	D
73.	A	74.	A	75.	D	76.	D
77.	C	78.	A	79.	B	80.	C
81.	B	82.	C	83.	D	84.	B
85.	B	86.	B	87.	A	88.	A
89.	C	90.	A	91.	A	92.	B
93.	A	94.	B	95.	D	96.	B
97.	D	98.	B	99.	D	100.	B
101.	A	102.	C	103.	D	104.	B
105.	A	106.	B	107.	B	108.	C
109.	A	110.	A	111.	C	112.	B

Fluid Dynamics

DRAG FORCE, VISCOSITY AND TERMINAL VELOCITY

1. The property of fluids due to which they resist their own flow is called:
   (A) Drag force (B) Surface tension
   (C) Viscosity (D) None of these
2. The resistance offered by a fluid to a solid moving inside it is called:
   (A) Drag force (B) Surface tension
   (C) Viscosity (D) None of these
3. A body passing through a viscous medium is affected by:
   (A) One force only (B) Two forces
   (C) Four forces (D) None of these
4. Machine parts are jammed due to:
   (A) Increase in viscosity of lubricant (B) Decrease in viscosity of lubricant
   (C) Decrease in surface tension of lubricant (D) None of these
5. $N\ s\ m^{-2}$ is unit of:
   (A) Drag force (B) Pressure
   (C) Surface tension (D) Coefficient of viscosity
6. A body moving through a viscous medium eventually comes to rest because of:
   (A) Force of gravity (B) Force of friction
   (C) Its weight (D) Both A and C
7. Glycerin has viscosity _____ the viscosity of water.
   (A) More than (B) Equal to
   (C) Less than (D) None of these
8. Unit of viscosity is:
   (A) $Kg\ m^{-1}\ sec^{-1}$ (B) $N\ s\ m^{-2}$
   (C) $J\ s\ m^{-3}$ (D) All of these
9. Density of a fluid is defined as:
   (A) Its volume to mass ratio (B) Product of volume and mass
   (C) Its mass of volume ratio (D) None of these
10. Fluid friction is ______ the friction between two solid surfaces.
    (A) Greater than (B) Smaller than
    (C) Equal to (D) None of these
11. Viscosity of water is ______ that of air but ______ that of plasma.
    (A) More, more (B) Less, more
    (C) Less, less (D) More, less
12. Stoke's law holds for:
    (A) Motion through free space (B) Motion through viscous medium
    (C) Bodies of all shapes (D) None of these
13. High speed meteors rushing through air reduces to ashes because of:
    (A) Force of gravity (B) High resistance of air
    (C) Drag force (D) None of these
14. The terminal velocity of a spherical object is given by:
    (A) $v_T = \frac{2\rho g r^2}{9\eta}$ (B) $v_T = \frac{mg}{6\pi\eta r v}$
    (C) Any of these (D) None of these
15. A massive object falls through a fluid:
    (A) Faster (B) Slower

(C) Slowest (D) None

16. Terminal velocity is the maximum velocity attained by a spherical droplet when the drag force ______ the weight of droplet.
   (A) Is smaller than (B) Is greater than
   (C) Becomes equal to (D) None of these

17. The ______ viscous a medium is, ______ is the value of terminal velocity of the droplet.
   (A) More, lesser (B) Lesser, more
   (C) Both A and B (D) Lesser, lesser

18. When the droplet moves with terminal velocity in a fluid, the net force acting on the droplet is:
   (A) F_D-mg (B) Zero
   (C) mg-F_D (D) None of these

19. Two copper balls of 1 cm and 2 cm in diameter are simultaneously dropped in the same viscous medium. The terminal velocity of bigger ball is:
   (A) Not affected due to its size (B) Twice that of small size ball
   (C) Four times that of small size ball (D) $\frac{1}{4}$th of that of small size ball

20. At high speeds, fluid friction ______ and fuel consumption ________.
   (A) Increases, decreases (B) Increases, increases
   (C) Decreases, increases (D) None of these

21. The variation of terminal velocity v_T of two spheres (fixed ρ) with their radii is:
   (A) $v_T \propto \frac{1}{r}$ (B) $v_T \propto r$
   (C) $v_T \propto r^2$ (D) None of these

22. Fog droplets are suspended in air when their weight is balanced by:
   (A) Force of gravity (B) Upward thrust due to air
   (C) Surface tension (D) None of these

23. Drag force increases if speed of the object moving through the fluid:
   (A) Increases (B) Decreases
   (C) Remains constant (D) None of these

24. Stoke's law is not applicable when the speed of the object moving through a fluid is:
   (A) Zero (B) Small
   (C) Large (D) None of these

25. Area and volume of a spherical droplet are given respectively as:
   (A) $\frac{4}{3}\pi r^3, 4\pi r^2$ (B) $4\pi r^2, \frac{4}{3}\pi r^3$
   (C) $\frac{3}{4}\pi r^3, 4\pi r^2$ (D) $4\pi r^3, \frac{3}{4}\pi r^2$

26. 0.10 cm can be written as:
   (A) 1.0×10^{-2} m (B) 1.0×10^{-3} cm
   (C) 1.0×10^{-4} cm (D) $1. \times 10^{-4}$ m

27. When the upward drag force of the fluid becomes equal to downward force of gravity of the droplet, then its velocity:
   (A) Starts increasing (B) Starts decreasing
   (C) Becomes constant (D) Is called escape velocity

28. The unit of viscosity in SI system is:
   (A) $kg^{-1}\ m\ sec^{-1}$ (B) $kg\ m^{-1}\ sec^{-1}$
   (C) $kg^{-1}\ m^{-1}\ sec$ (D) None of these

29. The drag force as given by Stoke's law is:
   (A) $6\pi^2 \eta r v$ (B) $6\pi\eta r^2 v$
   (C) $6\pi\eta r v$ (D) $6\pi\eta r v^2$

30. The dimensions of viscosity are:

(A) $M^2L^{-1}T^{-2}$ (B) $M^{-1}L^1T^{-1}$
(C) $M^{-1}L^{-1}T$ (D) $ML^{-1}T^{-1}$

31. A drop-like particle has a density of 10^3 kg/m^3. It falls through a fluid of $\eta = 10^{-3}$ (SI units) with a terminal velocity of 2.2×10^{-6} m/sec. The radius of the particle will be:

(A) 10^{-3} m (B) 10^{-4} m
(C) 10^{-5} m (D) 10^{-6} m

32. The drag force acting on a spherical droplet of radius 10^{-5} m moving with a velocity of 1 cm/sec in a fluid of viscosity 5.31×10^{-7} (SI units) comes out to be:

(A) 10^{-16} N (B) 10^{-14} N
(C) 10^{-12} N (D) 10^{-10} N

33. Given that ρ (for water) = 10^3 kg/m^3
η (for air) = 2×10^{-5} (SI units)
radius of droplet = 10^{-5} meters

then terminal velocity of droplet comes out to be nearly:

(A) 1 cm/sec (B) 10 cm/sec
(C) 100 cm/sec (D) None of these

FLUID FLOW—TYPES AND EQUATIONS

34. Study of fluids in motion basically involves law of conservation of:

(A) Mass (B) Energy
(C) Charge (D) Both A and C
(E) Both A and B

35. In a _______ flow, each particle of the fluid is called a streamline and different streamlines _______ cross each other.

(A) Streamline, cannot (B) Turbulent, cannot
(C) Streamline, can (D) None of these

36. The direction of the velocity of fluid at certain point and direction of streamline are:

(A) Same (B) Different from each other
(C) Diverging (D) Converging

37. The irregular or unsteady flow of the fluid is called:

(A) Laminar flow (B) Turbulent flow
(C) Streamline flow (D) Both A and C

38. Density of water and density of air have been found respectively as:

(A) 1 gm-cm^{-3}, 1.29 kg-m^{-3} (B) 1000 kg-m^{-3}, 1290 gm-m^{-3}
(C) 1000 kg-m^{-3}, 1.29 kg-m^{-3} (D) Only B and C

39. The equation of continuity is defined as $A_1v_1 = A_2v_2$. Unit of A_1v_1 is:

(A) Cubic meter (B) Cubic meter per second
(C) Square meter per second (D) None of these

40. If the fluid is _______ and flow is _______, then mass is conserved.

(A) Incompressible, unsteady (B) Compressible, steady
(C) Compressible, unsteady (D) Incompressible, steady

41. Ratio of mass to density gives:

(A) Volume (B) Pressure
(C) Energy (D) (Volume)$^{-1}$

42. IF A, v, t denote area of a pipe, velocity of the fluid and time of flow, then rate of flow will be:

(A) $\frac{Av}{t}$ (B) Avt
(C) Av (D) $\frac{vt}{A}$

43. From $A_1v_1 = A_2v_2$, it follows that velocity of flow in a pipe is ______ where there is constriction in the cross-section.
(A) Greater (B) Smaller
(C) Same (D) None of these

44. Turbulent flow is:
(A) Unsteady and regular (B) Steady and irregular
(C) Unsteady and irregular (D) None of these

45. As the water falls from a tap, the speed of water ______ and so its cross-sectional area ______.
(A) Increases, decreases (B) Decreases, increases
(C) Increases, increases (D) None of these

46. Unit of density to mass ratio is:
(A) m^3 (B) m^{-3}
(C) $kg\text{-}m^{-3}$ (D) None of these

47. In a steady flow of an incompressible fluid, the rate of flow of mass inward is equal to rate of flow of mass outward. This is statement of:
(A) Bernoulli's equation (B) Venturi equation
(C) Equation of continuity (D) Torricelli's theorem

48. We can infer from Bernoulli's theorem that where the speed of the fluid is high, there the pressure will be:
(A) High (B) Low
(C) Sometimes high, sometimes low (D) None of these

49. The pipe near the low end of a large water storage tank develops a small leak and a stream of water shoots from it. The top of water in the tank is 15 m above the point of leak. The water will rush from the hole at a speed of:
(A) 37 m sec^{-1} (B) 7 m sec^{-1}
(C) 27 m sec^{-1} (D) 17 m sec^{-1}

50. Chimney works ______ when it is ______.
(A) Worst, tall (B) Best, tall
(C) Best, small (D) Worst, small

51. The term $\frac{1}{2}\rho\upsilon^2$ in Bernoulli's theorem has unit of:
(A) Work (B) Force
(C) Volume (D) Pressure

52. Bernoulli's equation is the equation that relates:
(A) Pressure, volume and temperature (B) Fluid speed, temperature and height
(C) Height, fluid speed and pressure (D) None of these

53. The action of perfume bottles depends upon:
(A) Bernoulli's theorem (B) Equation of continuity
(C) Surface tension (D) None of these

54. If velocity of efflux is 100 m sec^{-1} and area of the hole is 0.06 cm^2, how much volume of water will flow out of the hole in one second?
(A) 6×10^{-4} m^3 (B) 6.0 m^3
(C) 600 m^3 (D) 6.0 cm^3

55. Bernoulli's theorem states that sum of pressure and kinetic and potential energies per unit ______ of an incompressible and ______ fluid remains constant.
(A) Volume, viscous (B) Area, non-viscous
(C) Area, viscous (D) Volume, non-viscous

56. Torricelli's theorem states that speed of efflux is ______ the velocity gained by the liquid in falling through the distance h under the action of ______.
(A) Equal to, gravity (B) Equal to, surface tension

(C) Smaller than, gravity
(D) Greater than, drag force

57. **Volume of a cylinder can be found by:**
(A) $\frac{4}{3}\pi r^3$
(B) $\pi r^2 l$
(C) Length × breadth × height
(D) None of these

58. **In deriving Bernoulli's equation, we assume that fluid is:**
(A) Compressible, viscous and flow is turbulent
(B) Incompressible, non-viscous and flow is steady state
(C) Incompressible, viscous and flow is steady state
(D) None of above

59. **The unit of ρgh in Bernoulli's equation is:**
(A) Pressure
(B) Volume
(C) Work
(D) Force

60. **Fluid means:**
(A) Solid
(B) Liquid
(C) Gas
(D) Both B and C

61. **For substances (like honey) that do not flow easily have ________ coefficients of viscosity.**
(A) Small
(B) Very small
(C) Large
(D) Zero

62. **Water flows through a hose of internal area of cross-section equal to 1 cm^2, at a speed of 1 m/sec. If the water is to come out at 20 m/sec, then the internal area of cross-section of the nozzle will be:**
(A) 5×10^{-2} cm^2
(B) 5×10^{-1} $(mm)^2$
(C) 5×10^{-3} m^2
(D) 5×10^{-6} m^2

63. **When the fluid is in motion, its flow may be:**
(A) Streamline
(B) Turbulent
(C) A or B
(D) None of these

64. **Streamline flow is also called:**
(A) Viscous flow
(B) Laminar flow
(C) Compressible flow
(D) All of these

65. **Water flows in a pipe of inside radius $\frac{5}{\sqrt{\pi}}$ cm at average speed of 5 m/sec. Its rate of flow in SI units is:**
(A) 125
(B) 1.25×10^{-4}
(C) 1.25×10^{-2}
(D) Both A and C are correct

66. **Above certain velocity of the fluid flow, the motion of the fluid becomes:**
(A) Steady and regular
(B) Unsteady and regular
(C) Steady and irregular
(D) Unsteady and irregular

67. **The rate of flow of water in certain pipe is 125 m^3/sec. If its area of cross-section is 25×10^{-4} m^2, then speed of water will be:**
(A) 6×10^{4} m/sec
(B) 3.125×10^{-7} m/sec
(C) 0.2×10^{-4} m/sec
(D) Both A and B are correct

68. **To understand behaviour of a fluid in motion, we must suppose that fluid:**
(A) Is non-viscous
(B) Is incompressible
(C) Motion is steady
(D) All of these
(E) None of these

69. **1000 kg/m^3 is equivalent to:**
(A) 1000 gms/cm^3
(B) 1 gm/cm^3
(C) 10 kg/cm^3
(D) None of these

70. **While deriving Bernoulli's equation, the law of conservation ______ becomes the base fact.**

(A) Mass (B) Energy
(C) Charge (D) Ampere

71. Water flows in a pipe of inside radius $\frac{1}{\sqrt{\pi}}$ meter at an average speed of 5 m/sec. If the radius of the other end of the pipe is $\sqrt{\frac{10}{\pi}}$ meter, then the water comes out with velocity of:
(A) 0.05 m/sec (B) 0.5 m/sec
(C) 5 m/sec (D) 50 m/sec

72. If A, v, t denote area, velocity and time, then rate of flow will be given by the formula:
(A) Av (B) Avt
(C) $\frac{Av}{t}$ (D) $\frac{vt}{A}$

73. The internal diameter of a hose is 2 mm. Its radius will be:
(A) 10^{-4} cm (B) 10^{-3} cm
(C) 10^{-2} cm (D) 10^{-1} cm

74. While deriving equation of continuity, the law of conservation of _______ becomes the base fact:
(A) Mass (B) Energy
(C) Charge (D) All of them

75. An equation in fluid dynamics relates pressure, fluid speed and height. This equation is called:
(A) Equation of continuity (B) Bernoulli's equation
(C) Venturi equation (D) None of these

76. If A, v, t denote area of the pipe, velocity of the fluid and time, respectively, then Avt will represent:
(A) Density (B) Mass
(C) Charge (D) Volume

77. Torricelli's theorem is an application of:
(A) Bernouli's equation (B) Equation of continuity
(C) Venturi equation (D) None of them

78. $P_1 - P_2 = \frac{1}{2}\rho v_2^2$ is called:
(A) Bernoulli's equation (B) Equation of continuity
(C) Venturi equation (D) None of them

BLOOD FLOW

79. Normally, the pressure of blood inside the walls is _______ the external atmospheric pressure.
(A) Equal to (B) Greater than
(C) Smaller than (D) None of them

80. Normally, the blood pressure (torr unit) in a healthy human body varies from:
(A) 200 to 100 (B) 150 to 70
(C) 120 to 80 (D) 100 to 60

81. As the human gets old, his blood pressure numbers tend to _______ due to _______ in the flexibility of vessel walls.
(A) Increase, decrease (B) Decrease, increase
(C) Increase, increase (D) Decrease, decrease

82. Systolic pressure means _______ and diastolic pressure means _______ blood pressure.
(A) High, low (B) Low, high
(C) Low, low (D) None of these

83. The units for measuring blood pressure are:
(A) Torr and mm of Hg (B) Torr and N/m^2

(C) mm of Hg and N/m² (D) None of above

84. **Blood is ______ fluid having a density ______ that of water.**

(A) An incompressible, nearly equal to (B) Compressible, less than

(C) Compressible, nearly equal to (D) None of these

85. **A high concentration of RBC (red blood cells) in the blood ______ its viscosity three to five times that of ______.**

(A) Increases, oil (B) Decreases, water

(C) Decreases, plasma (D) Increases, water

86. **Blood vessels are ______ and they stretch like a rubber hose.**

(A) Rigid (B) Not rigid

(C) Very hard (D) None of these

87. **A sphygmomanometer is an instrument used to:**

(A) Get an X-ray photograph (B) Measure blood pressure

(C) Test the blood group (D) None of these

88. **A stethoscope is an instrument used:**

(A) To get an X-ray photograph (B) To check the blood group

(C) To listen to sounds within human body (D) In operations

ANSWERS

1.	C	2.	A	3.	B	4.	A
5.	D	6.	B	7.	A	8.	D
9.	C	10.	B	11.	D	12.	B
13.	B	14.	C	15.	A	16.	C
17.	C	18.	B	19.	C	20.	B
21.	C	22.	B	23.	A	24.	C
25.	B	26.	D	27.	C	28.	B
29.	C	30.	D	31.	D	32.	C
33.	A	34.	E	35.	A	36.	A
37.	B	38.	E	39.	B	40.	D
41.	A	42.	C	43.	A	44.	C
45.	A	46.	C	47.	C	48.	B
49.	D	50.	B	51.	D	52.	C
53.	A	54.	A	55.	D	56.	A
57.	B	58.	B	59.	A	60.	D
61.	C	62.	D	63.	C	64.	B
65.	C	66.	D	67.	A	68.	D
69.	B	70.	B	71.	B	72.	A
73.	D	74.	A	75.	B	76.	D
77.	A	78.	C	79.	B	80.	C
81.	A	82.	B	83.	A	84.	A
85.	D	86.	B	87.	B	88.	C

****

Light

WAVES AND WAVEFRONTS

1. **Light has:**
   (A) Wave nature (B) Particle nature
   (C) Dual nature (D) None of them
2. **Light waves are:**
   (A) Transverse waves (B) Longitudinal waves
   (C) Compressional wave (D) None of them
3. **Wavelength of light, on the average, is given by:**
   (A) 10^{-14} m (B) 10^{-10} m
   (C) 10^{-6} m (D) 10^{-4} m
4. **Electromagnetic waves transport:**
   (A) Energy only (B) Momentum only
   (C) Both A and B are correct (D) None is correct
5. **Light waves are:**
   (A) Mechanical waves (B) Electromagnetic waves
   (C) Any of above (D) None of above
6. **Which one of the followings can act approximately as a source of monochromatic light:**
   (A) Neon lamp (B) Fluorescent tube
   (C) Sodium lamp (D) None of these
7. ☛ **Wavelength of red colour as compared to that of violet colour is:**
   (A) Smaller (B) Longer
   (C) Equal (D) None of these
8. **Frequency of red colour as compared to that of violet colour is:**
   (A) Equal (B) Smaller
   (C) Greater (D) None of these
9. **Monochromatic light means waves of:**
   (A) Same frequency (B) Same colour
   (C) Same wavelength (D) All of them
10. **The locus of all the points in the same phase of vibration is called:**
    (A) Wave packet (B) Wavefront
    (C) Wave number (D) None of these
11. **Angle between ray of light and the corresponding wavefront is:**
    (A) 0° (B) 60°
    (C) 90° (D) 120°
12. **Huygen principle is used to determine:**
    (A) Speed of light (B) Location of wavefront
    (C) About polarized and unpolarized light (D) None of them
13. **In case of point source of light, shape of wavefront is:**
    (A) Spherical (B) Cylindrical
    (C) Plane (D) None of above
14. **Speed of light in vacuum depends upon:**
    (A) Frequency (B) Wavelength
    (C) Amplitude (D) None of th[illegible]
15. ☛ **If λ = 400 nm, its value in angstrom unit (=10^{-10} m) is given as:**
    (A) 4×10^{3} (B) 4×10^{-17}
    (C) 4×10^{17} (D) 4×10^{-3}
16. **When the source of light is at very large distance, the shape of wav[illegible]**

(A) Spherical (B) Cylindrical
(C) Plane (D) None of these

17. The speed of the secondary wavelets as mentioned in Huygen's principle is ______ the speed of propagation of the wave itself.
(A) Equal to (B) Greater than
(C) Smaller than (D) None of these

18. Laws of reflection and refraction can also be explained by:
(A) Particle nature of light (B) Quantum nature of light
(C) Wave nature of light (D) Complex nature of light

19. The wave nature of light was proposed by:
(A) Newton (B) Thomas Young
(C) Huygen (D) None of these

20. Huygen's principle states that:
(A) Light travels in straight line (B) Light has dual nature
(C) Either of these (D) None of these

21. A line which represents the direction of travel of a wave is known as:
(A) Spherical wavefront (B) Locus
(C) Ray (D) Either B or C

22. The property of light which does not change with the nature of the medium is:
(A) Frequency (B) Amplitude
(C) Wavelength (D) None of these

INTERFERENCE

23. The appearance of colours in the soap (or oil) film results from:
(A) Dispersion (B) Interference
(C) Reflection (D) Refraction

24. Two sources are said to be coherent if they have:
(A) Same amplitude (B) Same wavelength
(C) Definite phase relation with each other (D) None of them

25. The path difference and phase difference are related to each other as:
(A) Phase difference = 2π × path difference
(B) Phase difference = $\frac{2\pi}{\lambda}$ × path difference
(C) Phase difference = $\frac{\lambda}{2\pi}$ × path difference
(D) Phase difference = $\frac{2\lambda}{\pi}$ × path difference

26. To observe interference of light, the condition, which must be met with is that the sources must be:
(A) Monochromatic (B) Phase coherent
(C) Both of above (D) None of above

27. In case of destructive interference of two waves, the amplitude of the resultant wave will be ______ either of the waves.
(A) Greater than (B) Smaller than
(C) Equal to (D) None of these

28. The terms phase difference and path difference are:
(A) Same (B) Different
(C) Equal (D) None of these

29. Phase change of 180° is equivalent to a path difference of:
(A) 2λ (B) λ
(C) $\lambda/2$ (D) $\lambda/4$

30. In case of constructive interference of two waves, the amplitude of the resultant wave is ______ either of the waves:
   (A) Greater than (B) Equal to
   (C) Smaller than (D) None of these

YOUNG DOUBLE SLIT EXPERIMENT

31. In an interference pattern of Young's Double Slit (YDS) experiment:
   (A) Bright fringes are wider than dark fringes (B) Dark fringes are wider than bright fringes
   (C) Both dark and bright fringes are of equal width (D) Central fringes are wider than the outer fringes
32. In YDS experiment, fringe spacing means the distance between two consecutive ______ fringes.
   (A) Bright (B) Dark
   (C) Any of A or B (D) None of these
33. In YDS experiment, at the centre of screen is formed a:
   (A) Dark fringe (B) Bright fringe
   (C) No fringe at all (D) None of these
34. Experimental demonstration of wave nature of light was given in 1801 by:
   (A) Newton (B) Maxwell
   (C) Thomas Young (D) Compton
35. In YDS experiment, condition for constructive interference is that path difference is equal to:
   (A) $n\lambda$ (B) $m\lambda$
   (C) $(n + \frac{1}{2})\lambda$ (D) $(m + \frac{1}{2})\lambda$
36. ☛ In case of YDS experiment, the distance between adjacent bright fringes is given by:
   (A) $\Delta y = \frac{\lambda L}{d}$ (B) $\Delta y = \frac{L}{\lambda d}$
   (C) $\Delta y = \frac{d}{\lambda L}$ (D) None of these
37. In case of YDS experiment, the distance of the mth bright fringe on the screen from centre is:
   (A) $y = (m + 1)\frac{\lambda L}{d}$ (B) $y = m\frac{\lambda L}{d}$
   (C) $y = (m + \frac{1}{2})\frac{\lambda L}{d}$ (D) None of these
38. ☛ In case of YDS experiment, the fringe spacing varies ______ with slit separation d and varies ______ with distance L between slits and screen.
   (A) Directly, directly (B) Inversely, inversely
   (C) Inversely, directly (D) Directly, inversely
39. ☛ In YDS experiment, if the distance between the slits and also the distance between slits and screen is doubled, the fringe width:
   (A) Becomes doubled (B) Becomes 4 times
   (C) Is halved (D) Remains the same
40. ☛ The fringe width in YDS experiment can be increased by decreasing:
   (A) Width of slits (B) Wavelength of light
   (C) Slits separation (D) Distance between slits and screen
41. ☛ If the slits in YDS experiment are made closer, fringe spacing will:
   (A) Increase (B) Decrease
   (C) Remain same (D) None of above
42. ☛ Fringe spacing in YDS experiment will be maximum if we use:

(A) Red light (B) Green light
(C) Violet light (D) Blue light

43. In YDS experiment, data given is $\lambda = 500$ nm, d = 1 mm, L = 100 cm, Δy comes out to be:
(A) 0.5 cm (B) 0.5 mm
(C) 0.5 nm (D) 0.5 m

44. YDS experiment can be used to determine:
(A) Grating element (B) Fringe spacing
(C) Wavelength of monochromatic light (D) Frequency of white light

45. The bending of light when it passes from one medium to another is known as:
(A) Refraction (B) Interference
(C) Polarization (D) Both B and C

46. In YDS experiment, the fringe spacing is equivalent to:
(A) $\frac{L}{\lambda d}$ (B) $\frac{d}{\lambda L}$
(C) $\frac{\lambda L}{d}$ (D) $\frac{dL}{\lambda}$

47. Conditions for interference are that the two sources should be coherent and:
(A) At a far off distance (B) Close together
(C) Coinciding (D) None of these

48. One of the following options represent the condition for destructive interference:
(A) Path difference $= \frac{\lambda}{2}$ (B) P.D. $= 2\frac{\lambda}{2}$
(C) P.D. $= 3\frac{\lambda}{2}$ (D) Both A and C
(E0 Both B and C

49. The distance between different interference fringes is:
(A) Variable (B) Same
(C) Different (D) None of these

50. In case of interference fringes:
(A) Energy is destroyed at dark fringes (B) Energy is created at bright fringes
(C) Energy is transferred from dark to bright fringes (D) None of these

51. The condition for destructive interference of two coherent waves is that the path difference should be:
(A) Odd integral multiple of $\frac{\lambda}{2}$ (B) $\left(n + \frac{1}{2}\right)\lambda$
(C) Both A and B (D) Even integral multiple of $\frac{\lambda}{2}$

52. In YDS experiment, the condition for constructive interference of two coherent waves is that the path difference should be:
(A) Integral multiple of $\frac{\lambda}{2}$ (B) Integral multiple of λ
(C) Even integral multiple of $\frac{\lambda}{2}$ (D) Both B and C

53. In YDS experiment using white light:

(A) Coloured fringes will be obtained
(B) No fringes will be observed
(C) Alternative bright and dark fringes will be seen
(D) None of these

NEWTON'S RINGS

54. A ________ lens is used in the apparatus to get Newton's rings.
(A) Plano-concave
(B) Plano-convex
(C) Convexo-concave
(D) Double convex

55. Newton's rings are formed due to:
(A) Diffraction
(B) Interference
(C) Polarisation
(D) Magnetisation

56. The central ring is bright in case of Newton's rings produced by:
(A) Reflected light
(B) Transmitted light
(C) Wedged film
(D) None of above

57. In Newton's rings apparatus, we also use:
(A) Spectroscope
(B) Telescope
(C) Microscope
(D) Any of these

58. Newton's rings are:
(A) Rectangular
(B) Spherical
(C) Concentric circles
(D) None of these

59. We use in Newton's rings:
(A) White light
(B) Monochromatic light
(C) Light having only two wavelengths
(D) None of above

60. In Newton's rings seen through the reflected light, central spot is:
(A) Bright
(B) Dark
(C) Either of the two
(D) None of these

61. To find wavelength of light by his experiment, Newton utilized:
(A) Principle of phase change
(B) Snell's law
(C) Bragg's law
(D) Both A and C

MICHELSON'S INTERFEROMETER

62. Michelson's interferometer can be used to measure:
(A) Wavelength of light
(B) Intensity of light
(C) Amplitude of wave
(D) None of above

63. In Michelson's interferometer apparatus, the number of mirrors and number of glass plates used respectively are:
(A) 2,3
(B) 3,2
(C) 3,3
(D) 2,2

64. In Micchelson's Interferometer, a bright fringe will be replaced by next move the movable mirror by an amount equal to:
(A) λ
(B) $\lambda/2$
(C) $\lambda/4$
(D) None of these

65. In Michelson's interferometer, the plates are placed in front of incident r-
(A) 45°
(B) 60°
(C) 90°
(D) 120°

66. In Michelson's Interferometer; the compensating plate is used to:
(A) Increase the path in one arm (B) Change the amplitude
(C) Equalize the path in both arms (D) None of these

67. In Michelson's Interferometer, a dark fringe will replace the nearest bright fringe each time the mirror is moved a distance of:
(A) $\lambda/4$ (B) $\lambda/2$
(C) λ (D) 2λ

68. Wavelength of light can be found by means of Michelson Interferometer using the formula:
(A) $\lambda = \frac{2m}{L}$ (B) $\lambda = \frac{L}{2m}$
(C) $\lambda = \frac{m}{2L}$ (D) $\lambda = \frac{2L}{m}$

69. In Michelson's Interferometer, the movable mirror is moved by 0.5000 mm and shift of 200 fringes is observed, the wavelength for light used is:
(A) 5×10^{-7} m (B) 5×10^{-4} m
(C) 5×10^{-6} m (D) None of above

70. In Michelson's interferometer, if the movable mirror is moved a distance of $\lambda/4$, the path difference between the two interfering waves changes by:
(A) $\lambda/4$ (B) $\lambda/2$
(C) λ (D) $3\lambda/2$

DIFFRACTION

71. The phenomenon of bending of light around edges of an obstacle is called:
(A) Interference (B) Diffraction
(C) Polorisation (D) None of above

72. Phenomenon of interference and diffraction support the:
(A) Quantum nature of light (B) Transverse nature of light
(C) Wave nature of light (D) Complex nature of light

73. A diffraction pattern is observed with a beam of red light. If the red light is replaced by the blue light, then fringes will:
(A) Disappear (B) Become broader and further apart
(C) Become narrower and crowded together (D) None of these

74. If N is number of lines per meter in a diffraction grating of length L, then its grating element will be given as:
(A) $\frac{N}{L}$ (B) $\frac{L}{N}$
(C) $\frac{L}{2N}$ (D) $\frac{2N}{L}$

75. A grating has 5000 lines per centimeter. Then grating element will be given as:
(A) 2×10^{-6} m (B) 2×10^{-3} m
(C) 2×10^{-10} m (D) 2×10^{-4} m

76. In case of diffraction grating, unit of grating element is:
(A) Centimeter (B) Kilometer
(C) As that of g (D) As that of angle

77. Sin θ = 0.5 for first order maximum in a diffraction gr... ...gle θ is equal to:

(A) 3° (B) 15°
(C) 30° (D) 60°

78. A typical diffraction grating may have over it the number of lines per centimeter equal to:
(A) 50 (B) 4000
(C) 50,000 (D) All of them

79. Given that grating element = 0.2×10^{-3} cm in case of a diffraction grating. Then number of lines per centimeter will be:
(A) 5000 (B) 500
(C) 50 (D) 5

80. Given that number of lines per meter = 5×10^5. Its grating element will be:
(A) 0.2×10^{-3} cm (B) 0.2×10^{-3} m
(C) 0.2×10^{-3} nm (D) None of above

81. Maximum number of orders available with a grating is ______ grating element.
(A) Independent of (B) Directly proportional to
(C) Inversely proportional to (D) None of these

82. We get light inside a room in day time due to:
(A) Polarization (B) Interference
(C) Diffraction (D) None of these

83. The spacing between lines of diffraction grating is:
(A) Opaque (B) Transparent
(C) Semi-transparent (D) None of these

84. Diffraction effect is:
(A) More for a round edge (B) More for a sharp edge
(C) Less for a sharp edge (D) None of these

85. A glass plate upon which is ruled a number of equally spaced opaque lines is called:
(A) Interferometer (B) Thin film
(C) Diffraction grating (D) None of these

86. If white light is incident on a diffraction grating, then on the other side of the grating is observed line/s of ______ colours.
(A) One (B) Two
(C) Six (D) Seven

BRAGG'S EQUATION

87. The Bragg's equation for x-rays diffraction is:
(A) $2d\sin\theta = m\lambda$ (B) $d\sin\theta = n\lambda$
(C) $2d\sin\theta = n\lambda$ (D) None of these

88. In Bragg's equation, θ is the angle made by the incident ray with:
(A) Normal to the crystal surface (B) The surface of the crystal
(C) Any of above (D) None of above

89. In Bragg's equation, d represents:
(A) Grating element (B) Slit separation
(C) Interplaner spacing (D) None of these

90. While deriving Bragg's equation, the effective path difference between the beams reflected from adjacent planes is:

(A) d sin θ (B) 2d sin θ
(C) 3d sin θ (D) Any one of them

91. X-ray diffraction has been used in studying the:
(A) Crystal structure (B) Haemoglobin
(C) Double helix structure of DNA (D) All of these

92. One of the following is used to measure the wavelength of X-rays:
(A) Young's double slit experiment (B) Diffraction grating
(C) Bragg's law (D) None of these

93. Wavelength of X-ray is of the order of:
(A) 10 A° (B) 1 A°
(C) 10^{-10}cm (D) Both B and C

ANSWERS

1.	C	2.	A	3.	C	4.	C
5.	B	6.	C	7.	B	8.	B
9.	D	10.	B	11.	C	12.	B
13.	A	14.	D	15.	A	16.	C
17.	A	18.	C	19.	C	20.	D
21.	C	22.	A	23.	B	24.	C
25.	B	26.	C	27.	B	28.	B
29.	C	30.	A	31.	C	32.	C
33.	B	34.	C	35.	B	36.	A
37.	B	38.	C	39.	D	40.	C
41.	A	42.	A	43.	B	44.	C
45.	A	46.	C	47.	B	48.	D
49.	B	50.	C	51.	C	52.	D
53.	B	54.	B	55.	B	56.	B
57.	C	58.	C	59.	B	60.	B
61.	A	62.	A	63.	D	64.	B
65.	A	66.	C	67.	A	68.	D
69.	C	70.	B	71.	B	72.	C
73.	C	74.	B	75.	A	76.	A
77.	C	78.	B	79.	A	80.	A
81.	B	82.	C	83.	B	84.	B
85.	C	86.	D	87.	C	88.	B
89.	C	90.	B	91.	D	92.	C
93.	B						

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List of Common Physics Notations

This is a list of common physical constants and variables, and their notations. Note that bold text indicates that the quantity is a vector.

LATIN CHARACTERS

Symbol	Meaning	SI unit of measure
A	area	meter squared (m^2)
	magnetic vector potential	
	amplitude	
a	acceleration	meters per second squared (m/s^2)
B	magnetic flux density also called the magnetic field density or magnetic induction	tesla (T), or equivalently, weber per square meter (Wb/m^2)
C	capacitance	farad (F)
	heat capacity	joule per kelvin ($J\ K^{-1}$), or equivalently, joule per degree Celsius ($J\ °C^{-1}$)
	constant of integration	varied depending on context
c	speed of light (in vacuum)	299,792,458 meter per second (m/s)
	speed of sound	340.29 meter per second (m/s)
	specific heat capacity	joule per kilogram per kelvin ($J\ kg^{-1}\ K^{-1}$), or equivalently, joule perkilogram per degree Celsius ($J\ kg^{-1}\ °C^{-1}$)
	viscous damping coefficient	kilogram per second (kg/s)
D	electric displacement field also called the electric flux density	coulomb per square meter (C/m^2)
D	density	kilograms per cubic meter (kg/m^3)
d	distance	meter (m)
	impact parameter	meter (m)
	diameter	meter (m)
	differential (e.g. dx)	
dA	differential vector element of surface area A, with infinitesimally small magnitude and direction normal to surface S	square meter (m^2)
dV	differential element of volume V enclosed by surface S	cubic meter (m^3)
E	electric field	newton per coulomb ($N\ C^{-1}$), or equivalently, volt per meter ($V\ m^{-1}$)
E	energy	joule (J)
e	eccentricity	unitless
	2.71828... (base of the natural logarithm), electron, elementary charge	

Symbol	Meaning	SI unit of measure
F	force	newton (N)
f	frequency	hertz (Hz)
	function	
	friction	newton (N)
G	the gravitational constant	newton meter squared per kilogram squared (N m^2/kg^2)
g	acceleration due to gravity	meter per second squared (m/s^2), or equivalently, newton per kilogramme(N/kg)
H	magnetic field strength also called just magnetic field	ampere per meter (A/m)
H	Hamiltonian	joule (J)
h	height	meter (m)
	Planck's constant	joule second (J s)
$\hbar$	reduced Planck's constant $\left(\frac{h}{2\pi}\right)$	joule second (J s)
I	action	joule second (J s)
	intensity	watt per square meter (W/m^2)
	sound intensity	watt per square meter (W/m^2)
	electric current	ampere (A)
	moment of inertia	kilogram meter squared (kg m^2)
i	intensity	watt per square meter (W/m^2)
	imaginary unit	
$\hat{i}$	Cartesian x-axis basis unit vector	unitless
J	free current density, not including polarization or magnetization currents bound in a material	ampere per square meter (A/m^2)
	impulse	kilogram meter per second (kg m/s)
$\hat{j}$	Cartesian y-axis basis unit vector	unitless
K	kinetic energy	joule (J)
k	Boltzmann constant	joule per kelvin (J/K)
	wavenumber	radians per meter (m^{-1})
$\hat{k}$	Cartesian z-axis basis unit vector	unitless
L	inductance	henry (H)
	luminosity	watt (W)
	angular momentum	newton meter second (N m s or kg m^2 s^{-1})
l	length	meter (m)
M	magnetization	ampere per meter (A/m)

Symbol	Meaning	SI unit of measure
	moment of force often simply called moment or torque	newton meter (N m)
m	mass	kilogram (kg)
N	normal vector	unit varies depending on context
	atomic number	unitless
n	refractive index	unitless
	principal quantum number	unitless
P	power	watt (W)
p	momentum	kilogram meter per second (kg m/s)
	pressure	pascal (Pa)
Q	electric charge	coulomb (C)
	Heat	joule (J)
q	electric charge	coulomb (C)
R	electrical resistance	ohm (Ω)
	Ricci tensor	unitless
	radiancy	
	gas constant	joule per kilogramme kelvin (J/kgK)
r	radius vector (position)	meter (m)
r	radius of rotation or distance between two things such as the masses inNewton's law of universal gravitation	meter (m)
S	surface area	m^2
	entropy	joule per kelvin (J/K)
	action	
s	arc length	meter (m)
	displacement	
T	period	second (s)
	thermodynamic temperature also called absolute temperature	kelvin (K)
t	time	second (s)
U	four-velocity	meter per second (m/s)
U	potential energy	joule (J)
	internal energy	joule (J)
u	relativistic mass	kilogram (kg)
	energy density	joule per cubic meter (J/m^3) or joule per kilogram (J/kg) depending on the context
V	voltage also called electric potential difference	volt (V)

Symbol	Meaning	SI unit of measure
	volume	cubic meter (m^3)
	shear force	
V	velocity	meter per second (m/s)
W	mechanical work	joule (J)
w	width	meter (m)
x	a generic unknown	varied depending on context
	displacement	meter (m)
Z	electrical impedance	ohm (Ω)

GREEK CHARACTERS

Symbol	Name	Meaning	SI unit of measure
α	alpha	angular acceleration	radian per second squared (rad/s^2)
β	beta	velocity in terms of the speed of light c	unitless
γ	gamma	Lorentz factor	unitless
		photon	
		gamma ray	
		shear strain	
		Heat capacity ratio	unitless
Δ	delta	a change in a variable (e.g. Δx)	unitless
		Laplace operator	
δ	delta	displacement (usually small)	
ϵ	epsilon	permittivity	farad per meter (F/m)
		strain	unitless
ζ	zeta	damping ratio	unitless
η	eta	energy efficiency	unitless
		coefficient of viscosity also called simply viscosity	pascal second (Pa s)
θ	theta	angular displacement	radian (rad)
K	kappa	torsion coefficient also called torsion constant	newton meter per radian (N m/rad)
Λ	lambda	cosmological constant	per second squared (s^{-2})
λ		wavelength	meter (m)
μ	mu	magnetic moment	ampere square meter ($A\ m^2$)
		coefficient of friction	unitless
		dynamic viscosity	Pascal second (Pa s)
		permeability (electromagnetism)	Henry per meter (H/m)

Symbol	Name	Meaning	SI unit of measure
		reduced mass	kilogram (kg)
ν	nu	frequency	hertz (Hz)
		kinematic viscosity	meters squared per second (m^2/s)
π	pi	3.14159... (irrational number)	
ρ	rho	mass density usually simply called density	kilogram per cubic meter (kg/m^3)
		free electric charge density, not including dipole charges bound in a material	coulomb per cubic meter (C/m^3)
		resistivity	Ohm meter (Ω m)
Σ	sigma	summation operator	
σ	sigma	electrical conductivity	Siemens per meter (S/m)
		normal stress	
τ	tau	torque	newton meter (N m)
		shear stress	
		time constant	second (s)
		6.28318... (2π)	
Φ	phi	field strength	unit varies depending on context
		magnetic flux	Weber (Wb)
ϕ	phi	electric potential Higgs Field	
Ψ	psi	wave function	Unitless
ω	omega	angular frequency	radian per second (rad/s)
Ω	omega	electric resistance	ohm

OTHER CHARACTERS

Symbol	Name	Meaning	SI unit of measure
$\nabla\cdot$	nabla dot	the divergence operator often pronounced "del dot"	per meter (m^{-1})
$\nabla\times$	nabla cross	the curl operator often pronounced "del cross"	per meter (m^{-1})
∇	nabla	del (differential operator)	
∂	"der", "dow", "die", "partial" or simply "d"	partial derivative (e.g. $\partial y/\partial x$)	
$\square$	D'Alembert operator	$\nabla^2 - \partial_t^2$	

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Dictionary of Physics

Absolute zero: lowest possible temperature at which gas would have a zero volume.
Absorption spectrum: spectrum of electromagnetic radiation absorbed by matter when radiation of all frequencies is passed through it.
Acceleration: change in velocity divided by time interval over which it occurred.
Accuracy: closeness of a measurement to the standard value of that quantity.
Achromatic lens: lens for which all light colors have the same focal length.
Action-reaction forces: pair of forces involved in an interaction that are equal in magnitude and opposition in direction.
Activity: number of decays per second of a radioactive substance.
Adhesion: force of attraction between two unlike materials.
Air resistance: force of air on objects moving through it.
Alpha decay: process in which a nucleus emits an alpha particle.
Alpha particle: positively- charged particles consisting of two protons and two neutrons emitted by radioactive materials.
Ammeter: device to measure electrical current.
Amorphous solid: solids that have no long- range order, no crystal structure.
Ampere: unit of electric current; one ampere is the flow of one coulomb of charge per second.
Amplitude: in any periodic motion, the maximum displacement from equilibrium.
Angle of incidence: angle between direction of motion of waves and a line perpendicular to surface the waves are striking.
Angle of reflection: angle between direction of motion of waves and a line perpendicular to surface the waves are reflected from.
Angle of refraction: angle between direction of motion of waves and a line perpendicular to surface the waves have been refracted from.
Angular momentum: quantity of rotational motion. For a rotating object, product of moment of inertia and angular velocity.
Annihilation: process in which a particle and its antiparticle are converted into energy.
Antenna: device used to receive or transmit electromagnetic waves.
Antineutrino: subatomic particle with no charge or mass emitted in beta decay.
Antinode: point of maximum displacement of two superimposed waves.
Archimedes' principle: object immersed in a fluid has an upward force equal to the weight of the fluid displaced by the object.
Artificial radioactivity: radioactive isotope not found in nature.
atomic mass unit: unit of mass equal to 1/12 the atomic mass of carbon- 12 nucleus.
Atomic number: number of protons in the nucleus of the atom.
Average acceleration: acceleration measured over a finite time interval
Average velocity: velocity measured over a finite time interval.
Back-EMF: potential difference a cross a conductor caused by change in magnetic flux.
Band theory: theory explaining electrical conduction in solids.
Baryon: subatomic particle composed of three quarks. Interacts with the strong nuclear force.
Battery: device that converts chemical to electrical energy consisting of two dissimilar conductors and an electrolyte.
Beat : slow oscillation in amplitude of a complex wave
Bernoulli's principle: when a fixed quantity of fluid flows, the pressure is decreased when the flow velocity increases.
Beta decay: radioactive decay process in which an electron or positron and neutrino is emitted from a nucleus.
Beta particle: high speed electron emitted by a radioactive nucleus in beta decay.
Binding energy: negative of the amount of energy needed to separate a nucleus into individual nucleons.
Boiling point: temperature at which a substance, under normal atmospheric pressure, changes from a liquid to a vapor state.
Breeder reactor: nuclear reactor that converts nonfissionable nuclei to fissionable nuclei while producing energy.
Bubble chamber: instrument containing superheated liquid in which the path of ionizing particles is made visible as trails of tiny bubbles.
Buoyant force: upward force on an object immersed in fluid.
Calorimeter: device that isolates objects to measure temperature changes do to heat flow.
Candela: unit of luminous intensity.
Capacitance: ratio of charge stored per increase in potential difference.
Capacitor: electrical device used to store charge and energy in the electrical field.
Capillary action: rise of liquid in narrow tube due to surface tension.
Carnot efficiency: ideal efficiency of heat engine or refrigerator working between two constant temperatures.
Centripetal force: force that causes centripetal acceleration.
Chain reaction: nuclear reaction in which neutrons are produced that can cause further reactions.
Charged : object that has an unbalance of positive and negative electrical charges.
Charging by conduction: process of charging by touching neutral object to a charged object.
Charging by induction: process of charging by bringing neutral object near charged object, then removing part of resulting separated charge.
Chromatic aberration: variation in focal length of lens with wavelength of light.
Circular motion: motion with constant radius of curvature caused by acceleration being perpendicular to velocity.
Clock reading: time between event and a reference time, usually zero.
Closed, isolated system: collection of objects such that neither matter nor energy can enter or leave the collection.
Closed-pipe resonator: cylindrical tube with one end closed and a sound source at other end.
Coefficient of friction: ratio of frictional force and the normal force between two forces.
Coefficient of linear expansion: change in length divided by original length and by temperature change.
Coefficient of volume expansion: change in volume divided by original volume and by temperature change.
Coherent waves: waves in which all are in step; are in phase.
Cohesive force: attractive force between similar substances.
Complementary color: two colors that, when added, produce white light. Two pigments, that when combined, produce black.
Compound machine: machine consisting of two or more simple machines.
Compton effect: interaction of photons, usually X rays, with electrons in matter resulting in increased wavelength of X rays and kinetic energy of electrons.
Concave lens: lens thinner in center than edges; a diverging lens.

Concave mirror: converging mirror, one with center of curvature on reflecting side of mirror.
Conduction band: energies of charge carries in a solid such that the carries are free to move.
Conductor: materials through which charged particles move readily; or heat flow readily.
Conserved properties: property that is the same before and after an interaction.
Consonance: two or more sounds that, when heard together, sound pleasant.
Constant acceleration: acceleration that does not change in time.
Constant velocity: velocity that does not change in time.
Constructive interference: superposition of waves resulting in a combined wave with amplitude larger than the component waves.
Convection: heat transfer by means of motion of fluid.
Conventional current: motion of positive electrical current.
Converging lens: lens that causes light rays to converge; usually a convex lens.
Convex lens: lens that is thicker in the center than at edges.
Convex mirror: diverging mirror. Center of curvature is on side opposite reflecting side of mirror.
Cosine: the ratio of the adjacent side to the hypotenuse.
Coulomb: unit of electrical charge. Charge caused by flow of one ampere for one second.
Crest of wave: high point of wave motion.
Critical angle: minimum angle of incidence that produces total internal reflection.
Crystal lattice: structure of solid consisting of regular arrangment of atoms.
De Broglie wavelength: length of de Broglie wave of particle; Planck's constant divided by momentum of particle.
Decibel: unit of sound level.
Dependent variable: variable that responds to change in manipulated variable.
Derived units: unit of quantity that consists of combination of fundamental units.
Destructive interference: superposition of waves resulting in a combined wave with zero amplitude.
Diffraction: bending of waves around object in their path.
Diffraction grating: material containing many parallel lines very closely spaced that produces a light spectrum by interference.
Diffuse reflection: reflection of light into many directions by rough object.
Dimensional analysis: checking a derived equation by making sure dimensions are the same on both sides.
Diode: electrical device permitting only one way current flow.
Dispersion of light: variation with wavelength of speed of light through matter resulting in separation of light into spectrum.
Displacement: change in position. A vector quantity.
Dissonance: two or more sounds that, when together, sound unpleasant.
Distance: separation between two points. A scalar quantity.
Diverging lens: lens that causes light rays to spread apart or diverge; usually a concave lens.
Dopants: small quantities of material added to semiconductor to increase electrical conduction.
Doppler shift: change in wavelength due to relative motion of source and detector.
Dynamics: study of motion of particles acted on by forces.
Effective current: DC current that would produce the same heating effects.
Effective voltage: DC potential difference that would produce the same heating effects.
Efficiency: ratio of output work to input work.
Effort force: force extended on a machine.
Elastic collision: interaction between two objects in which the total energy is the same before and after the interaction.
Elasticity: ability of object to original shape after deforming forces are removed.
Electrical charge pump: device, often a battery or generator, that increase potential of electrical charge.
Electrical circuit: continuous path through which electrical charges can flow.
Electrical current: flow of charged particles.
Electrical field: property of space around a charged object that causes forces on other charged objects.
Electric field lines: lines representing the direction of electric field.
Electric field strength: ratio of force exerted by field on a tiny test charge to that change.
Electric generator: device converting mechanical energy into electrical energy.
Electric potential: ratio of electric potential energy to charge.
Electric potential difference: difference in electric potential between two points.
Electric potential energy: energy of a charged body in an electrical field.
Electromagnet: device that uses an electric current to produce a concentrated magnetic field.
Electromagnetic force: one of fundamental forces due to electric charges, both static and moving.
Electromagnetic induction: production of electric field or current due to change in magnetic flux.
Electromagnetic radiation: energy carried by electromagnetic waves throughout space.
Electromagnetic waves: wave consisting of oscillating electric and magnetic fields that move at speed of light through space.
Electromotive force: potential difference produced by electromagnetic induction.
Electron: subatomic particle of small mass and negative charge found in every atom.
Electron cloud: region of high probability of finding an electron around an atom.
Electron diffraction: effects on electrons due to wave-like interference of electrons with matter.
Electron gas model: description of current flow through conductors.
Electroscope: device to detect electric charges.
Electrostatics: study of properties and results of electric charges at rest.
Electroweak force: unification of electromagnetic and weak forces.
Elementary charge: magnitude of the charge of an electron. 1.602 *10^-19
Emission spectrum: spectrum produced by radiation from excited atoms.
Energy: non-material property capable of causing changes in matter.
Energy levels: amounts of energy an electron in an atom may have.
Entropy: measure of disorder in a system; ratio of heat added to temperature.
Equilibrant force: force needed to bring an object into transitional equilibrium.
Equilibrium: condition in which net force is equal to zero. Condition in which net torque on object is zero.
Equivalent resistance: single resistance that could replace several resistors.
Evaporation: change from liquid to vapor state.
Excited state: energy level of atom higher than ground state.
External forces: forces exerted from outside a system.
Extrinsic semiconductor: semiconductor in which conduction is primarily the result of added impurities.
Factor-label method: dimensional analysis.

Farad: unit of capacitance. One coulomb per volt.
Ferromagnetic materials: materials in which large internal magnetic fields are generated by cooperative action of electrons.
First harmonic: in music, the fundamental frequency.
First law of thermodynamics: change in internal or thermal energy is equal to heat added and work done on system. Same as law of conservation of energy.
Fluid: material that flows, i.e. liquids, gases, and plasmas.
Focal length: distance from the focal point to the center of a lens or vertex of a mirror.
Focal point: location at which rays parallel to the optical axis of an ideal mirror or lens converge to a point.
Forbidden gap: energy values that electrons in a semiconductor or insulator may not have.
Force: agent that results in accelerating or deforming an object.
Frame of reference: coordinate system used to define motion.
Fraunhofer lines: absorption lines in the sun's spectrum due to gases in the solar atmosphere.
Frequency: number of occurrences per unit time.
Friction: force opposing relative motion of two objects are in contact.
Fundamental particles: those particles(i.e. quarks and leptons) of which all materials are composed.
Fundamental tone: lowest frequency sound produced by a musical instrument.
Fundamental units: set of units on which a measurement system is based(i.e. meter, second, kilogram, ampere, candela).
Fuse: metal safety device in an electric circuit that melts to stop current flow when current is too large.
Fusion: combination of two nuclei into one with release of energy.
Galvanometer: device used to measure very small currents.
Gamma decay: process by which a nucleus emits a gamma ray.
Gamma particle: high energy photon emitted by a radioactive nucleus.
Gas: state of matter that expands to fill container.
Geiger-Mueller tube: device used to detect radiation using its ability to ionize matter.
General theory of relativity: explanation of gravity and accelerated motion invented by Einstein.
Gluon: carrier of strong nuclear force.
Grand unified theories: theories being developed that unify the stronger and electroweak forces into one force.
Gravitational field: distortion of space due to the presence of mass.
Gravitational force: attraction between two objects due to their mass.
Gravitational mass: ratio of gravitational force to object's acceleration.
Gravitational potential energy: change of energy of object when moved in a gravitational field.
Graviton: particle that carries the gravitational force. Not yet observed.
Ground state: lowest energy level of an electron in an atom.
Grounding: process of connecting a charged object to Earth to remove object's unbalanced charge.
Half-life: length of time for half of a sample of radioactive material to decay.
Harmonics: frequencies produced by musical instrument that are multiples of fundamental tone.
Heat: quantity of energy transferred from one object to another because of a difference in temperature.
Heat engine: device that converts thermal energy to mechanical energy.
Heat of fusion: quantity of energy needed to change a unit mass of a substance from solid to liquid state at the melting point.
Heat of vaporization: quantity of energy needed to change a unit mass of a substance from liquid to gaseous state at the boiling point.

Heavy water: deuterium oxide used mainly in CANDU nuclear reactors.
Heisenberg uncertainty principle: the more accurately one determines the position of a particle, the less accurately the momentum can be known, and vice versa.
Hertz: unit of frequency equal to one event or cycle per second.
Hole: absence of an electron in a semiconductor.
Hooke's law: deformation of an object is proportional to force causing it.
Huygens' wavelets: model of spreading of waves in which each point on wavefront is source of circular or spherical waves.
Hydraulic system: machines using fluids to transmit energy.
Hyperbola: mathematical curve that describes an inverse relationship between two variables.
Hypotenuse: side opposite the right angle in a triangle.
Ideal mechanical advantage: in simple machine, the ratio of effort distance to resistance distance.
Illuminance: rate at which electromagnetic wave energy falls on a surface.
Illuminated object: object on which light falls.
Image: reproduction of object formed with lenses or mirrors.
Impulse: product of force and time interval over which it acts.
Impulse-momentum theorem: impulse given to an object is equal to its change in momentum.
Incandescent body: object that emits light because of its high temperature.
Incident wave: wave that strikes a boundary where it is either reflected or refracted.
Incoherent light: light consisting of waves that are not in step.
Independent variable: variable that is manipulated or changed in an experiment.
Index of refraction: ratio of the speed of light in vacuum to its speed in a material.
Inelastic collision: collision in which some of the kinetic energy is changed into another form.
Inertia: tendency of object not to change its motion.
Inertial mass: ratio of net force exerted on object to its acceleration.
Initial velocity: velocity of object at time $t=0$.
Instantaneous acceleration: acceleration at a specific time; slope of tangent to velocity- time graph.
Instantaneous position: position of an object at specific time.
Instantaneous velocity: slope of the tangent to position- time graph.
Insulator: material through which the flow of electrical charge carriers or heat is greatly reduced.
Interference fringes: pattern of dark and light bands from interference of light waves.
Interference of waves: displacements of two or more waves, producing either large or smaller waves.
Internal forces: forces between objects within a system.
Intrinsic semiconductor: semiconductor in which conduction is by charges due to host material, not impurities.
Inverse relationship: mathematical relationship between two variables, x and y, summarized by the equation $xy=k$, where k is a constant.
Ionizing radiation: particles or waves that can remove electrons from atoms, molecules, or atoms in a solid.
Isolated system: a collection of objects not acted upon by external forces into which energy neither enters nor leaves.
Isotope: atomic nuclei having same number of protons but different numbers of neutrons.
Joule: SI unit of energy equal to one Newton-meter.
Joule heating: increase in temperature of electrical conductor due to conversion of electrical to thermal energy.
Kelvin temperature scale: scale with 0 K= absolute zero and 273.16 K = triple point of water.

Kepler's laws: three laws of motion of bodies attracted together by the gravitational force.
Kilogram: SI unit of mass.
Kilowatt hour: amount of energy equal to 3.6 * 10^ 6 J. Usually used in [illegible] measurement.
Kinematics [illegible] of motion of objects without regard to the causes of th[illegible].
Kinetic energy: energy of object due to its motion.
Kinetic-molecular energy: description of matter as being made up of extremely small particles in constant motion.
Laser: devise that produces coherent light by stimulated emission of radiation.
Laser- induced fusion: proposed method of creating nuclear fusion by using heating caused by intense laser beams to squeeze matter together.
Law of conservation of energy: in a closed, isolated system, the total momentum is constant.
Law of reflection: angle of incidence of a wave is equal to the angle of reflection.
Law of universal gravitation: gravitational force between two objects depends directly on the product of their masses and inversely on the square of their separation.
Lens: optical device designed to converge or diverge light.
Lens equation: See mirror equation.
Lenz's law: magnetic field generated by an induced current opposes the change in field that caused the current.
Lepton: particle that interacts with other particles only by the electroweak and gravitational interactions.
Lever arm: component of the displacement of the force from the axis of rotation in the axis of rotation in the direction perpendicular to the force.
Light: electromagnetic radiation with wavelengths between 400 and 700 nm that is visible.
Linear accelerator: device to accelerate subatomic particles by applying successive electric field.
Linear relationship: relationship between two variables, x and y, summarized by the equation y= ax + b, where a and b are constant.
Linear restoring force: force in direction toward equilibrium position that depends linearly on distance from distance from that position.
Liquid: materials that have fixed volume but whose shape depends on the container.
Lodestone: naturally occurring magnetic rock.
Longitudinal waves: wave in which direction of disturbance is the same as the direction of travel of wave.
Loudness: physiological measure of amplitude of a sound wave; heard on pitch and tone color as well as amplitude.
Lumen: unit of luminous flux.
Luminance intensity: measure of light emitted by source in candelas; luminous flux divided by 4pie.
Luminous flux: flow of light from source measured in lumens.
Luminous object: object that emits light, as opposed to one that reflects light.
Lux: unit of luminous flux; one lumen per square meter.
Machine: device that changes force needed to do work.
Magnetic field: space around a magnet throughout which magnetic force exists.
Magnification: ratio of size of an optical image to the size of the object.
Manipulated variable: variable that the experimenter can change.
Mass defect: mass equivalent of the binding energy; m=E/c^ 2
Mass number: number of nucleons (protons plus neutrons) in the nucleus of an atom.
Mass spectrometer: device used to measure the mass of atoms or molecules.
Matter wave: wave-like properties of particles such as electrons.
Mechanical advantage: ratio of resistance force to effort force in a machine.
Mechanical energy: sum of potential and kinetic energy.
Mechanical resonance: condition at which natural oscillation frequency equals frequency of driving force; amplitude of oscillatory motion at a maximum.
Mechanical wave: wave consisting of periodic motion of matter; e.g. sound wave or water wave as opposed to electromagnetic wave.
Melting point: temperature at which substance changes from solid to liquid state.
Meson: medium mass subatomic particle consisting of combination of a quark and antiquark.
Meter: SI unit of length.
Mirror equation: 1/do +1/di=1/f, where do is object distance, di is image distance, f is focal length.
Moderator: material used to decrease speed of neutrons in nuclear reactor.
Momentum: product of object's mass and velocity.
Monochromatic light: light of a single wavelength.
Mutual inductance: measures the amount of overlap between the magnetic flux produced in one coil and that which passes through a second coil, thus the amount of EMP induced in a secondary coil by the varying flux in the primary coil.
Myopia: defect of eye, commonly called nearsightedness, in which distant objects focus in front of the retina.
n-type semiconductor: semiconductor in which current is carried by electrons.
Net force: vector sum of forces on object.
Neutral: object that has no net electric charge.
Neutrino: chargeless, massless, subatomic particle emitted with beta particles; type of lepton.
Neutron: subatomic particle with no charge and mass slightly greater than that of proton; type of nucleon.
Newton: SI unit of force.
Newton's law of motion: laws relating force and acceleration.
Node: point where disturbances caused by two or more waves result in no displacement.
Normal: perpendicular to plane of interest.
Normal force: force perpendicular to surface.
Nuclear equation: equation representing a nuclear reaction.
Nuclear fission: reaction in which large nucleus splits into two parts, often approximately equal in mass.
Nuclear fusion: reaction in which two nuclei are combined into one.
Nuclear reaction: reaction involving the strong force in which the number of p[illegible]otons or neutrons in a nucleus changes.
Nuclear reactor: device in which nuclear fusion is used to generate electricity.
Nuclear transmutation: change of one nucleus into another as the result of a nuclear reaction.
Nucleon: either a proton or a neutron.
Nuclide: nucleus of an isotope.
Object: source of diverging light rays; either luminous or illuminated.
Octave: interval between two frequencies with a ratio of two to one.
Ohm: SI unit of resistance; one volt per ampere.
Ohm's law: resistance of object is constant, independent of voltage across it.
Opaque: material that does not transmit light.
Open- pipe resonator: cylindrical tube with both ends closed [illegible] sound source at one end.
p-type semiconductor: semiconductor in which conduction is [illegible] result of motion of holes.
Pair production: formation of particle and antiparticle from g[illegible] rays

Parabolic mirror: mirror the shape of a paraboloid of revolution that has no spherical aberration.
Parallel circuit: circuit in which there are two or more paths for current flow.
Parallel connection: connection of two or more electrical devices between two points to provide more than one current path.
Pascal: SI unit of pressure; one neutron per square meter.
Pascal's principle: pressure applied to a fluid is transmitted undiminished throughout it.
Period: time needed to repeat one complete cycle of motion.
Periodic motion: motion that repeats itself at regular intervals of time.
Photoelectric effect: election of electrons from surface of metal exposed to electromagnetic radiation.
Photon: quantum of electromagnetic waves; particle aspect of these waves.
Photovoltaic cell: device that converts electromagnetic radiation into electrical energy.
Physics: study of matter and energy and their relationship.
Piezoelectricity: electric potential produced by deforming material.
Pigment: colored material that absorbs certain colors and transmits or reflects others.
Pitch: perceived sound characteristics equivalent to frequency.
Planck's constant: ratio of energy of photon to its frequency.
Plane mirror: flat, smooth surface that reflects light regularly.
Plasma: state of matter in which atoms are separated into electrons and positive ions or bare nuclei.
Point object: object idealized as so small to be located at only one position.
Polarized light: light in which electric fields are all in same plane.
Position: separation between object and a reference point.
Position- time graph: graph of object's motion that shows how its position depends on clock reading, or time.
Positron: antiparticle equivalent of electron.
Potential difference: difference in electric potential between two points.
Potential energy: energy of object due to its position or state.
Potentiometer: electrical device with variable resistance; rheostat.
Power: rate of doing work; rate of energy conversion.
Precision: degree of exactness in a measurement.
Pressure: force per unit area.
Primary coil: transformer coil that, when connected to voltage source, creates varying magnetic flux.
Primary light colors: red, green, or blue light.
Primary pigment: yellow, green, or magenta light.
Principal axis: line connecting center of curvature of spherical mirror with its geometric vertex. Line perpendicular to plane of lens passing through its center.
Principle of superposition: displacement due to two or more forces is equal to vector sum of forces.
Projectiles: motion of objects given initial velocity that then move only under force of gravity.
Proton: subatomic particle with positive charge that is nucleus of hydrogen atom.
Quantized: a quantity that cannot be divided into smaller increments forever, for which there exists a minimum, quantum increment.
Quantum mechanic: study of properties of matter using its wave properties.
Quantum model of atom: atomic model in which only probability of locating electron is known.
Quantum number: integer ratio of energy to its quantum increment.
Quark: basic building block of protons, neutrons, other baryons, and mesons.
Quark model: model in which all particles that interact via the strong interaction are composed of two or three quarks.

Radiation: electromagnetic waves that carry energy.
Radioactive decay: spontaneous change of unstable nuclei into other nuclei.
Radioactive materials: materials that undergo radioactive decay.
Range of projectile: horizontal distance between launch point of projectile and where it returns to launch height.
Ray model of light: light may be represented by straight line along direction of motion.
Ray optics: study of light using ray model.
Rayleigh criterion: two optical images are separable if central bright spot of one image falls on first dark band of second.
Real image: optical image at which rays from object converge.
Receiver: device that detects electromagnetic waves.
Reference level: location at which potential energy is chosen to be zero.
Reference point: zero location in a coordinate system or frame of reference.
Refraction: change in direction of light ray when passing one medium to another.
Refractive index: ratio of speed of light in vacuum to that in the medium.
Resistance: ratio of potential difference across device to current through it.
Resistance force: force exerted by a machine.
Resistor: device designed to have a specific resistance.
Responding variable: variable that changes as result of change in manipulated variable.
Rest energy: energy due to mass of object; E= mc^ 2.
Resultant: vector sum of two or more vectors.
Right -hand rules: used to find force on current or moving particle in magnetic field; used to find direction of magnetic field caused by current or of induced EMF.
Rutherford's model of atom: nuclear model of atom; essentially all mass in compact, positively- charged object at center, surrounded by electrons.
Scalar: quantity, like distance, that has only a magnitude, or size.
Schematic diagram: representation of electric circuit using symbols.
Scientific notation: numbers expressed in form M * 10 ^ n , where 1< M < 10, and n is an integer.
Scintillation: flash of light emitted when substance is struck by radiation.
Second: SI unit of time.
Second law of thermodynamics: heat flow only from region of high temperature o region of lower temperature.
Secondary coil: transformer coil in which varying EMF is induced.
Secondary light colors: yellow, cyan, or magenta light.
Secondary pigment: red, green, or blue pigment.
Self- inductance: induced EMF produced in coil by changing current.
Semiconductor: material in which electrical conduction is smaller than that in a conductor, but more than in insulator.
Series circuit: circuit in which electrical current flows through each component, one after another.
Series connection: arrangement of electrical devices so that there is only one path through which current can flow.
Short circuit: low resistance connection between two points, often accidental.
SI: internationally agreed -upon method of using the metric system of measurement.
Significant digit: reliable digits reported in a measurement.
Simple harmonic motion: motion caused by linear restoring that has a period independent of amplitude of motion.
Simple machine: machine consisting of only one lever, inclined plane, wedge, screw, pulley, or wheel and axle.
Sine: the ratio of the opposite side and the hypotenuse.
Sliding friction: force between two surfaces in relative motion.

Slope: ratio of the vertical separation, or rise to the horizontal separation, or run.
Solid: state of matter with fixed volume and shape.
Sound level: quantity measuring logarithm of sound intensity in decibels.
Spark chamber: device used to detect path of charged subatomic particles by a spark that jumps along path of ionization created in a gas.
Specific heat: thermal energy needs to change temperature of unit mass of substance one Kelvin.
Spectroscope: device used to study spectrum of material.
Spectrum: collection of wavelengths in electromagnetic spectrum.
Speed: ratio of distance traveled to time interval.
*Speed of light in vacuum, 2.99792458 * 10^8 m/s.*
Spherical aberration: inability of spherical mirror to focus all parallel rays to a single point.
Standing wave: wave with stationary nodes.
Static friction: force that opposes start of motion between two surfaces.
Step- down transformer: transformer with output voltage smaller than input voltage.
Step- up transformer: transformer with output voltage larger than input voltage.
Stimulated emission: emission of photon from excited atom caused by impact fo photon of same energy.
Strong nuclear force: force of very short range that holds neutrons and protons in nucleus together.
Superconductor: electrical conductor that has no resistance and low temperatures.
Surface wave: wave on surface of liquid with characteristics of both longitudinal and transverse waves.
Symmetry: property that is now charged when operation or reference frame is charged.
Synchrotron: device to accelerate particles in which particles move in circular path.
System: defined collection of objects.
tangent: the ratio of the opposite side and the adjacent side.
Temperature: measure of hotness of object on a quantitative scale. In gases, proportional to average kinetic energy of molecules.
Terminal velocity: velocity of falling object reached when force of air resistance equals weight.
Test charge: charge used, in principle, to measure electric field.
Thermal energy: internal energy. Sum of kinetic and potential energy of random motion of particles making up object.
Thermal equilibrium: state between two or more bodies where temperatures do not change.
Thermal expansion: increase of length or volume of object due to change in temperature.
Thermometer: device used to measure temperature.
Thermonuclear reaction: nuclear fusion.
Thin- film interference: light interference caused by reflection from both front and rear surface of thin layer of liquid or solid.
Timbre: sound quality or tone color, spectrum of sound frequencies that produce a complete wave.
Time interval: difference in time between two clock readings.
Tokamak: type of fusion reactor.
Tone color: timbre or tone quality.
Torque: product of force and the lever arm.
Trajectory: the path followed by projectile.

Transformer: device to transform energy from one electrical circuit to another by means of mutual inductance between two coils.
Transistor: semiconductor device that controls large current by means of small voltage changes.
Translucent: material transmitting light without but distorting its path.
Transmutation: nuclear change from one element to another.
Transparent: material transmitting light without distorting directions of waves.
Transverse waves: wave in which disturbance is perpendicular to direction of travel of wave.
Traveling wave: moving, periodic disturbance in a medium or field.
Trigonometry: branch of math that deals with the relationship among angles and sides of triangles.
Trough of wave: low point of wave motion, where displacement is most negative.
Uniform acceleration: constant acceleration.
Uniform circular motion: motion in a circle of constant radius with constant speed.
Valence band: in a solid, the range of energies of electrons that are bound to atoms.
Vector quantity: quantity having both magnitude (size) and direction.
Vector resolution: process of finding the effective value of a component in a given direction.
Velocity: ratio of change in position to time interval over which change takes place.
Velocity- time graph: plot of velocity of object as a function of time.
Virtual image: point from which light rays appear to diverge without actually doing so.
Viscous fluid: fluid that creates force that opposes motion of objects through it. The force is proportional to object's speed.
Volatile liquid: liquid that is easily vaporized.
Watt: unit of power, one joule per second.
Wavelength: distance between corresponding points on two successive waves.
Wave pulse: single disturbance moving through a medium or field.
Weak boson: particle that carries or transmits the weak interaction of force.
Weak interaction: force involved in beta decay of the neutron and atomic nuclei; one aspect of the electroweak force.
Weight: force of gravity of an object.
Weightlessness: object in freefall, on which only the gravitational force acts.
Wilson cloud chamber: chamber containing supersaturated vapor through which ionizing radiation leaves trails of visible droplets.
Work: product of force and displacement in the direction of the force.
Work function: energy needed to remove an electron from metal.
Work energy theorem: work done on object is equal to the change in its kinetic energy.
X ray: high- energy photons; high- frequency, short-wavelength electromagnetic waves.
X-ray diffraction: A complicated technique using x-rays to "create an image" where no lense to focus the light rays is available.
X-ray images: Images such as photographs or computer enhanced images produced by bombarding a target with x-rays.
Young's modulus: A constant of proportionality associated with the change in length of a material according to its elastic properties.
Zero-point energy: The lowest energy state of molecular vibration

General Knowledge:

World Geography

SOME FACTS ABOUT THE EARTH

Estimated age	About 4500 million years	
Superficial area	510, 100, 500 sq. km.	(196, 950, 000 sq. m)
Land surface	148, 951, 000 sq. km.	(57, 510, 000 sq. m.)
Water surface	(71% of the total area)	361, 150, 000 sq. km.
Equatorial circumference	40, 075 km	(24902m.)
Polar diameter	12714 km.	(7900 m.)
Distance from the Sun	149.6 million km.	(92, 857, 000 m.)
Highest point of the Earth's land surface	Mt. Everest	(8,850 meters) (29, 035 ft.)
Lowest point of the Earth's land surface	Shores of the Dead Sea, Israel – Jordan 396 meters (1299 feet) below sea level.	
Greatest ocean depth	Marinas Trench, east of the Philippines	11033m. (36, 198 feet) below sea level.

HIGHEST MOUNTAINS OF THE WORLD

Mountain	Country	Feet	Metres
Everest	Nepal/Tibet	29,035	8,850
K-2 (Godwin Austen)	Pakistan	28,250	8,611
Kanchenjunga	India/Nepal	28,169	8,586
Lhotse I	Nepal/Tibet	27,940	8,516
Makalu I	Nepal/Tibet	27,766	8,463
Cho Oyu	Nepal/Tibet	26,906	8,201
Dhaulagiri	Nepal	26,795	8,167
Mansalu I	Nepal	26,781	8,163
Nanga Parbat	Pakistan	26,660	8,125
Annapurna	Nepal	26,545	8,091
Gasherbrum I	Pakistan/China	26,470	8,068
Broad Peak	Pakistan/China	26,400	8,047
Gosainthan (Shishma Pangma)	Tibet	26,397	8,046
Gasherbrum II	Pakistan/China	26,360	8,035
Annapurna II	Nepal	26,041	7,937
Gyachung Kang	Nepal	25,910	7,897
Disteghil Sar	Pakistan	25,858	7,882
Himalchuli	Nepal	25,801	7,864
Nuptse	Nepal	25,726	7,841
Nanda Devi	India	25,663	7,824
Masherbrum	Kashmir	25,660	7,821
Rakaposhi	Pakistan	25,551	7,788
Kanjut Sar	Pakistan	25,461	7,761
Kamet	India/Tibet	25,446	7,756
Namcha Barwa	Tibet	25,445	7,756
Gurla Mandhata	Tibet	25,355	7,728
Ulugh Muztagh	Tibet	25,340	7,723
Kungur	China	25,325	7,719
Tirich Mir	Pakistan	25,230	7.690
Saser Kangri	India	25,172	7,672

Mountain	Country	Feet	Metres
Makalu II	Nepal	25,120	7,657
Minyan Konka	China	24,900	7,590
Kula Kangri	Bhutan	24,783	7,554
Chang-tzu	Tibet	24,780	7,553
Muztagh Ata	China	24,757	7,546
Skyang Kangri	Kashmir	24,750	7,544
Communism Peak	Tajikistan	24,590	7,495
Jongsong Peak	Nepal	24,472	7,459
Pobeda Peak	Kyrgyzstan	24,406	7,439
Sia Kangri	Kashmir	24,350	7,422
Haramosh Peak	Pakistan	24,270	7,397
Istoro Nal	Pakistan	24,240	7,388

Note: All these mountain peaks are located in Asia. The highest elevation points of all the continents are as under:

HIGHEST ELEVATION POINTS OF THE WORLD

Continent	Highest Point	Location	Feet	Metres
Asia	Mt. Everest	Nepal/Tibet	29,035	8 850
S. America	Mt. Aconcagua	Argentina	22,834	6 960
N. America	Mt. McKinley	U.S.(Alaska)	20,320	6,194
Africa	Mt. Kilimanjaro	Tanzania	19,340	5 895
Europe	Mt. Elbrus	Russia	18,510	5 642
Antarctica	Vinson Massif	Ellsworth Mts	16,066	4 897
Australia	Mt. Kosciusko	New South Wales	7,310	2 228

PRINCIPAL DESERTS OF THE WORLD

Name	Country	Area in Sq. miles
Sahara	North Africa	3500000
Libyan	North Africa	450000
Australian	Australia	-
Great Victoria	Australia	150000
Syrian	Syria/Arabia	100000
Arabian	Arabia	70000
Gobi	Mongolia	500000
Rub'al Khaii	Arabia	250000
Kalahari	Botswana	225000
Great Sandy	Australia	150000
Takla Makan	China	140000
Arunta	Australia	-
Kara Kum	S.W. Turkistan (Russia)	120000
Nubian	North Africa	100000
Thar	N.W. India	100000
Kizil Kum	Central Turkistan	100000

LARGEST ISLANDS OF THE WORLD

Name	Area in sq. miles	Location
Greenland	840000	North Atlantic Ocean
New Guinea	317000	South West Pacific
Borneo	287400	S.W. Pacific
Malagassy Republic	227800	Indian Ocean
Baffin Island	183810	Arctic Ocean
Sumatra	182860	Indian Ocean

Great Britain	88619	N. Atlantic
Honshu	87293	N.W. Pacific
Ellesmere	76600	Arctic Ocean
Victoria Island	74400	Arctic Ocean
Celebes	72987	Indian Ocean
New Zealand (South)	58093	S.W. Pacific
Java	48763	Indian Ocean
New Zealand (North)	44281	S.W. Pacific
Newfoundland	42734	N. Atlantic
Cuba	41634	Caribbean Sea
Iceland	39698	N. Atlantic
Ireland (incl N. Ireland)	31839	N. Atlantic
Dominican Rep.& Haiti	29530	Caribbean Sea
Sakhalin	28597	N.W. Pacific
Tasmania	26215	S.W. Pacific
Sri Lanka	25332	Indian Ocean

PRINCIPAL OCEANS OF THE WORLD

Ocean	Area in Sq. km	Greatest Depth in Feet
Pacific Ocean	165,250,000	36200
Atlantic Ocean	82,440,000	30246
Indian Ocean	73,440,000	24442
Arctic Ocean	14,090,000	17881
	SEAS	
Mediterranean Sea	2,505,000	16470
South China Sea	3,447,000	18241
Bering Sea	2,270,000	13750
Caribbean Sea	2,754,000	25197
Gulf of Mexico	1,544,000	14370
Sea of Okhotsk	1,528,000	11400
East China Sea	1,248,000	9840
Hudson Bay	1,233,300	850
Sea of Japan	1,008,000	12280
North Sea	575,000	2170
Black Sea	461,000	7360
Red Sea	438,000	7370
Baltic Sea	422,000	1440
Yellow Sea	404,000	300

Greatest Ocean Depth: Mariana Trench, east of the Philippines (11033 m (36198 feet) below sea level
Mean Depth of the Sea: 12009 feet
Largest and the Oldest Ocean: Pacific Ocean

MAJOR RIVERS OF THE WORLD (By Length)

River	Location	Miles	Km
Nile	Africa	4,145	6,673
Amazon	Peru	4,000	6,440
Mississippi-Missouri	USA	3,740	6,021
Changjiang (Yangtze)	China (Asia)	3,720	5,989
Yenisei-Angara	Russia	3,650	5,877
Amur-Argun	China (Asia)	3,590	5,780
Ob-Irtysh	China	3,360	5,410
Plata-Parana	Brazil	3,030	4,878
Huang He (Yellow)	China	2,903	4,674
Congo (Zaire)	Congo	2,900	4,669

River	Location	Miles	Km
Lena	Russia	2,730	4,395
Mackenzie	South America	2,635	4,242
Mekong	Asia	2,600	4,186
Niger	Africa	2,600	4,186
Missouri	USA	2,533	4,078
Mississippi	USA	2,348	3,780
Murray-Darling	Australia	2,330	3,751
Volga	Russia	2,290	3,687
Madeira	S. America	2,013	3,241
Sao Francisco	S. America	1,988	3,201
Yukon	Alaska	1,979	3,186
Rio Grande	USA–Mexico	1,885	3,035
Purus	S. America	1,860	2,995
Tunguska, Lower	Russia	1,860	2,995
Indus	Asia	1,800	2,898
Danube	Europe	1,776	2,859
Brahmaputra	Asia	1,770	2,850
Salween	Asia	1,750	2,818

PRINCIPAL LAKES OF THE WORLD

Lake	Country	Sq. Km
Caspian Sea (salt)	RUSSIA - Iran	393,898
Superior	USA - Canada	82,814
Victoria	Kenya Uganda Tanzania	69,485
Aral (salt)	RUSSIA	68,682
Huron	USA - Canada	59,596
Michigan	USA	58,016
Tanganyika	Tanzania Zambia Zaire	32,893
Great Bear	Canada	31,792
Baikal	RUSSIA	31,492
Great Slave	Canada	28,438
Erie	USA - Canada	25,745
Winnipeg	Canada	24,341
Malawi	Malawi - Mozambique	23,310
Ontario	USA - Canada	19,529
Balkhash	RUSSIA	18,260
Ladoga	RUSSIA	18,130
Chad	Nigeria Niger Chad	15,540
Onega	RUSSIA	9,842
Eyre (salt)	Australia	9,324
Rudolf (salt)	Kenya	9,065
Titicaca	Peru - Bolivia	9,065
Athabasca	Canada	8,081
Nicaragua	Nicaragua	7,697
Reindeer	Canada	6,389
Issyk: Kul	RUSSIA	6,190
Koko: (salt)	China	5,957
Torrens (salt)	Australia	5,775

HIGHEST WATERFALLS OF THE WORLD

Waterfall	Location	Feet	Meters
Angel	Venezuela	3,281	1,000

Waterfall	Location	Feet	Meters
Tugela	South Africa	3,000	914
Cuquenan	Venezuela	2,000	610
Sutherland	New Zealand	1,904	580
Takkakaw	Columbia	1,650	503
Ribbon (Yosemite)	California	1,612	491
Upper Yosemite	California	1,430	436
Gavarnie	France	1,384	422
Vettisfoss	Norway	1,200	336
Widow's Tear (Yosemite)	California	1,170	357
Staubbach	Switzerland	984	300
Middle Cascade (Yosemite)	California	909	277
King Edward VIII	Guyana	850	259
Gersoppa	India	829	252
Kaieteur	Guyana	822	251

WORLD'S LARGEST DAMS

Dam	Location	Volume (Thousands)		Year Completed
		Cubic Meters	Cubic Yards	
Syncrude	Canada	540,000	706,320	UC
Chapeton	Argentina	296,200	311,539	UC
Pati	Argentina	238,180	276,026	UC
New Cornelia Tailings	United States	209,500	274,445	1973
Tarbela	Pakistan	121,720	159,210	1976
Kambaratinsk	Kyrgyzstan	112,200	146,758	UC
Fort Peak	Montana	96,049	125,628	1940
Lower Usama	Nigeria	93,000	121,644	1990
Cipasang	Indonesia	90,000	117,720	UC
Ataturk	Turkey	84,500	110,522	1990
Yacyreta-Apipe	Paraguay/ Argentina	81,000	105,944	UC
Guri (Raul Leoni)	Venezuela	78,000	102,014	1986
Rogun	Tajikistan	75,500	98,750	1985
Oahe	South Dakota	70,339	92,000	1963
Mangla	Pakistan	65,651	85,872	1967
Gardiner	Canada	65,440	85,892	1968
Afsluitdijk	Netherland	63,400	82,927	1932
Oroville	California	59,639	78,008	1968
San Luis	California	59,405	77,700	1967
Nurek	Tajikistan	58,000	75,861	1980

Note: UC = Under Construction

Expected Questions FOR COMING EXAMS.

1. **Who was the leader of the 1958 coup in Iraq, which led to proclamation of Iraq as a Republic?**
(A) Saddam Hussain (B) Nuri Al Said
(C) Abdul Karim✓ (D) Abdul Rahman

2. **Major Shabbir Sharif was awarded Nishan-e-Haider posthumously. Which other mode for bravery was he awarded during his career in the Army?**
(A) Tamgha-e-Basalat
(B) Nishan-e-Shujaat
(C) Hilal-e-Jurat **(D) Sitara-e-Jurat✓**

3. **Which Indian personality served as the President of the UN General Assembly in 1953-54?**
(A) S. Radha Krishnan
(B) Gopalaswamy Ayyangar
(C) V.K Menon
(D) Vijayalakshami Pamdit✓

4. **In which organ of the United Nations, all member states of the UN are represented?**
(A) Economic and Social Council
(B) General Assembly✓
(C) Security Council
(D) Human Rights Council

5. **Ustad Allah Baksh was a famous _______ of Pakistan.**
(A) Classical singer (B) Sitar player
(C) Tabla player **(D) Painter✓**

6. **UNFCC (UN Framework Convention on Climate Change) was adopted during the Earth Summit at Rio de Janeiro (1992). When did it come into force?**
(A) March 1994✓ (B) August 1995
(C) October 1996 (D) January 1994

7. **De Beers is one of the biggest name in diamond industry. Who was the founder of De Beers Consolidated Mining Company?**
(A) John Cecil Rhodes✓
(B) Joseph D. Rockefeller
(C) Krugger (D) Robert Johnson

8. **Who was the first UN High Commissioner for Human Rights?**
(A) Mary Robinson✓
(B) Jose Ayla Lasso
(C) P.B. Samuel (D) Wilfard Hansen

9. **The Treaty of European Union (1992) is also known as:**
(A) Treaty of the Hague
(B) Treaty of Brussels
(C) Measurement Treaty✓
(D) None of these

10. **King Abdul Aziz Ibn Saud named the Kingdom of Hejaz and Najd as Saudi Arabia in:**
(A) 1924 (B) 1930
(C) 1932✓ (D) 1936

11. **Headquarter of the African Union (AU) is located in:**
(A) Johannesburg (B) Cairo
(C) Dakar **(D) Addis Ababa✓**

12. **Which of the following Indian Nobel Prize winners is associated with economics?**
(A) V.S Naipaul **(B) Amartya Sen✓**
(C) C.V. Roman (D) Rabindranath Tagore

13. **When was the first Nobel Prize awarded?**
(A) 1892 (B) 1900
(C) 1901✓ (D) 1904

14. **The Presidency of the United Nations Security Council rotates (in alphabetical order) among its members every:**
(A) 6 months (B) 3 months
(C) 2 months **(D) Month✓**

15. **UNESCO which deals with Education, Science and Culture, has its headquarters in:**
(A) New York (B) Vienna
(C) Paris✓ (D) Geneva

16. **Beijing Declaration and Platform for Action (1992) deals with?**
(A) International trade
(B) Rights and status of women✓
(C) Rights and protection of children
(D) Population control

17. **Sharmeen Obaid Chinoy of Pakistan won an Oscar Award for best dcumentary film. What was the title of the film?**
(A) Acid Burns (B) Desperate Women
(C) Dark Shadows **(D) Saving Face✓**

18. **"Chauburji" in Lahore is one of the famous monuments belonging to the Mughal period. It was reportedly built a gateway to a beautiful garden built for Princess Zebunnissa. She was an accomplished daughter of which Mughal Emperor?**
(A) Shahjahan (B) Akbar
(C) Jahangir **(D) Aurangzeb✓**

19. **"World Economic Forum", which holds its annual sessions in Davos, Switzerland, was founded by:**
(A) Henry Kissinger (B) Konrad Adenau
(C) W. Senwad✓ (D) None of these

20. **When was the right to vote was given to women in Switzerland?**

(A) 1935 (B) 1950
(C) 1965 (D) 1971✓

21. the Leaning Tower of Pisa is located in which country?
(A) Switzerland (B) Italy✓
(C) Malta (D) The Netherlands

22. U Thant was the first UN Secretary General from Asia. To which country did he belong to?
(A) Thailand (B) Cambodia
(C) Japan (D) Burma✓

23. On which river, the Baglihar Dam is constructed by India?
(A) Chenab✓ (B) Jhelum
(C) Indus (D) Setluj

24. Which one of the following countries expelled the Palestine Liberation Organization (PLO) in 1970?
(A) Syria (B) Lebanon
(C) Israel (D) Jordan✓

25. Which actor played the role of Quaid-e-Azam Muhammad Ali Jinnah in the feature film "Jinnah" directed by Jamil Dehlavi?
(A) N. Wadia (B) Ben Kingsley
(C) Christopher Lee✓
(D) Peter O Togie

26. The Oscar Award winning film 'Slumdog Millionaire" is based on the book "Q and Q" written by:
(A) Hanif Qurershi (B) Shashi Tharor
(C) Vikas Swarup✓ (D) Manesh Bahl

27. What was the real name of the famous Pakistani actor Santosh Kumar?
(A) Nazir Baig (B) Syed Mushtaq Rizvi
(C) Syed Musa Raza✓ (D) Younus Khan

28. Climate Change Conference COP21 was held in Paris. Where was COP20 held?
(A) Lima✓ (B) Kyoto
(C) Montreal (D) New York

29. Which of the following species is endemic to Pakistan?
(A) Indus River Dolphins✓
(B) Snow Leopards
(C) Gypsy Vultures (D) Houbara Bustard

30. Which animals are most illegally traded in the world?
(A) Elephants (B) Rhinoceros
(C) Pangolins✓ (D) Turtles

31. Reshma was a legendary folk singer of Pakistan. She died of cancer in Lahore in:
(A) Nov. 2013✓ (B) Nov. 2012
(C) Jan. 2009 (D) Dec. 2014

32. Famous TV drama "Waris" was written by?
(A) Atta-ul-Haq Qasmi
(B) Dr. Anwar Sajjad
(C) Amjad Islam Amjad✓
(D) Younis Butt

33. What was the rank of former Foreign Minister, Gohar Ayub Khan, when he left the Army?
(A) Captain✓ (B) Major
(C) Colonel (D) Brigadier

34. Who was the American Ambassador who died along with President Zia-ul-Haq, in plane crash in 1988?
(A) Tom Simon (B) Robert M Samuel
(C) Arnold Backer (D) Arnold Lewis Raphel

35. Kamran Baradari is one of the oldest Mughal monuments and located in Lahore. Who exactly was Kamran?
(A) Brother of Queen Noorjahan
(B) Son of Babar / step brother of Humayun✓
(C) First husband of Noorjahan
(D) Brother of Sher Shah Suri

36. The youngest son of Maharaja Ranjit Singh was elevated as Maharaja at a tender age of about 5 years. What was his name?
(A) Naunahal Singh (B) Kharrak Singh
(C) Daleep Singh✓ (D) Langa Singh

37. Khudadad Khan was the first South Asian soldier in the British Army to receive the highest military award for gallantry, the Victoria Cross, during the First World War. In which country was the fighting where he performed the act of bravery, which earned him the Victoria Cross?
(A) France (B) Austria
(C) Belgium✓ (D) Netherlands

38. Deosai National Park is remarkable as it is one of the highest plateaus in the world with an average elevation of 4,114 meters. In which region of Pakistan is it located?
(A) Balochistan (B) Potohar-Punjab
(C) Gilgit Baltistan✓ (D) Khyber Pakhtunkhwa

39. G.T. Road is one of the main highways of Pakistan. What does G.T stand for?
(A) General Traffic (B) Grand Trunk✓
(C) General Turner (D) None of these

40. How many administrative divisions are there in Punjab?
(A) 8 (B) 6
(C) 3 (D) 9✓

41. Which one of the following districts of Punjab has the lowest population density?
(A) Dera Ghazi Khan✓
(B) Layyah
(C) Rajanpur (D) Bahawalpur

42. Lal Suhanra National Park is located near:
(A) Multan (B) Bahawalpur✓
(C) D.G. Khan (D) Sahiwal

43. Hingol National Park, located in Makran District, Balochistan, is famous for its:
(A) Thick forest cover(
B) Archeological sites✓
(C) Mud (D) All of these

44. Falkland Islands of the Malvinas Islands are disputed between the United Kingdom and:
(A) Brazil (B) Russia
(C) Argentina✓ (D) Peru

45. Grassland plants located in Argentina are called:

(A) Prairies (B) Downa
(C) Steppes **(D) Pampas✓**

46. **Strait of Gibraltar connects the Atlantic Ocean with the:**
(A) Pacific Ocean (B) Indian Ocean
(C) Mediterranean Sea✓
(D) None of these

47. **Taj Mahal is located on the bank of river:**
(A) Jamna (Yamuna)✓
(B) Ganga
(C) Nerbada (D) Brahmaputra

48. **The capital of Kosovo is:**
(A) Zagreb **(B) Pristina✓**
(C) Sarajevo (D) Bratislava

49. **Usain Bolt holds the world record for 100 meters race. To which country does he belong to?**
(A) Barbados **(B) Jamaica✓**
(C) USA (D) Kenya

50. **Detroit, USA is associated with ________ industry.**
(A) Automobile✓ (B) Computer
(C) Toys (D) Electronics

51. **Faiz Ahmad Faiz was awarded the Lenin Peace Prize in 1962. In which year did Abdul Sattar Edhi receive the Lenin Peace Prize?**
(A) 1988✓ (B) 1990
(C) 1992 (D) 1995

52. **Who said "Right is a reasonable claim recognized by the society and enforced by the state."**
(A) Laski **(B) Bosanquet✓**
(C) Green (D) Mars

53. **Who among the following argues that the fault lines of civilization are the breeding grounds of conflicts in the 21st century?**
(A) Francis Fukuyama
(B) Samuel Huntington✓
(C) Henry Kissinger (D) Nelson Mandela

54. **The "Zero Sum Game" as employed by the supporters of 'game theory" assumes that:**
(A) The loss of one party is the gain of the other party
(B) The loss of one party is the loss of the other party as well
(C) The gain of one party is the gain of the other party
(D) The gain or loss of one party has nothing to do with the gain or loss of the other party✓

55. **Zagreb is the capital of:**
(A) Bosnia (B) Kosovo
(C) Croatia✓ (D) Serbia

56. **Maslow's "Needs Hierarchy" theory relates to:**
(A) Motivation✓ (B) Leadership
(C) Communication (D) Upward mobility

57. **Who said "man is by nature a political animal"?**
(A) Winston Churchill (B) Karl Marx
(C) Aristotle✓ (D) Plato

58. **During the British rule, the only British King to visit India and hold his Darbar was:**
(A) Edward VII **(B) George V✓**
(C) James II (D) Edward

59. **Ramsar Convention provides a framework for national action and international cooperation for conservation and wise use of wetlands. The Convention was adopted in 1971 in Ramsar, which is a city located in:**
(A) Iran✓ (B) Egypt
(C) Morocco (D) Iraq

60. **"Facebook" is one of the most poplar social networking service. When was it launched?**
(A) 1998 (B) 2000
(C) 2003 **(D) 2004✓**

61. **Famous Urdu poet Mustafa Zaidi was by profession a:**
(A) University · Professor (B) Businessman
(C) Lawyer **(D) Civil Servant✓**

62. **Article 257 of the Constitution relates specifically to Jammu and Kashmir. According to the Article when the people of Jammu and Kashmir accede to Pakistan then:**
(A) They shall become citizens of independent Kashmir
(B) Kashmir shall become a province of Pakistan
(C) People of Kashmir shall determine the relationship between the state and Pakistan✓
(D) Kashmir shall become an autonomous region

63. **The first battle of Panipat was fought between:**
(A) Alexander and Porus
(B) Babar and Ibrahim Lodhi✓
(C) Babar and Rana Sanga
(D) Humayun and Sher Shah Suri

64. **India tested its first nuclear device on:**
(A) 15 May 1972 **(B) 15 May 1974✓**
(C) 11 May 1998 (D) 20 May 1999

65. **HDI (Human Development Index) as an indicator of the well-being of a country, was the brainchild of:**
(A) Amartya Sen (B) Muhammad Yunas
(C) M.B. Lodhi **(D) Mahboob-ul-Haq✓**

66. **Zimbabwe was earlier known as:**
(A) Southern Rhodesia✓
(B) Gold Coast
(C) Salisbury (D) Southern Land

67. **Which public holiday is celebrated in the USA on 4 July every year?**
(A) Constitution Day **(B) Independence Day✓**
(C) Blacks Day (D) New Deal

68. **Which country in the Middle East is the Hashemite Kingdom?**
(A) Jordan✓ (B) Kuwait
(C) Syria (D) Yemen

69. **Which body of people is sometimes referred**

to as the "Fourth Estate"?
(A) Judiciary (B) Executive
(C) The Press✓ (D) Senate

70. "Kindergarten" refers to?
(A) A nursery school✓
(B) A small garden
(C) A children playground
(D) A children's ward in hospital

71. What did Burma change its name to in 1989?
(A) Myanmar✓ (B) Rangoon
(C) Yangoon (D) Naypyidaw

72. What is meant by "cock and bull story"?
(A) True story (B) A lengthy tale
(C) Story told by an idiot
(D) An unbelievable tale✓

73. Rule of thumb means:
(A) Mark of thumb on a legal paper
(B) An easily applied procedure for making a determination✓
(C) An easy choice (D) An unknown rule

74. Renaissance movement started firstly in:
(A) France **(B) Italy✓**
(C) United Kingdom (D) Sweden

75. GDP stands for:
(A) Gross Daily Product
(B) Gross Domestic Product✓
(C) Gross Domestic Purchase
(D) Gross Daily Purchase

76. The capital of Tajikistan is:
(A) Dodoma (B) Dushanbe
(C) Astana✓ (D) Tashkent

77. World Water Day is celebrated on:
(A) 22nd March✓ (B) 22nd June
(C) 22nd July (D) 22nd April

78. One who is capable of dealing with many subjects is called:
(A) Genius (B) Intellectual
(C) Versatile✓ (D) Vulnerable

79. What is the one word substitution for a person who is unable to pay his debt?
(A) Poor (B) Vagabond
(C) Solvent **(D) Insolvent✓**

80. The Great Persian Empire was founded by:
(A) Darius-I (B) Raza Shah Pehlvi
(C) Cyrus the Great✓
(D) Shah Abbas

81. The palace of Persepolis in Iran was destroyed in 331 B.C. by:
(A) A flood
(B) Alexander the Great✓
(C) Genghis Khan (D) Ottoman Turks

82. The palace of King Nebuchadnezzar was situated in the city of:
(A) Nineveh **(B) Babylon✓**
(C) Khorasan (D) Khums

83. The world famous "Golden Gate Bridge" is situated in:
(A) London (B) Paris
(C) San Francisco✓ (D) Sydney

84. "The Last Supper", a famous Renaissance painting was a masterpiece of:
(A) Titan (B) Michelangelo
(C) Leonardo da Vinci✓
(D) Raphael

85. The International secretariat of Amnesty International is situated in:
(A) New York **(B) London✓**
(C) Geneva (D) Paris

86. Which is called the "Land of the Midnight Sun"?
(A) Denmark (B) Belgium
(C) Norway✓ (D) Canada

87. Wimbledon, known for lawn tennis courts, is in:
(A) New York **(B) London✓**
(C) Washington (D) Geneva

89. Britain's highest military award is:
(A) Victoria Cross✓ (B) Iron Cross
(C) Military Cross (D) Medal of Honour

90. The book "A Farewell to Arms" was written by:
(A) Ernest Hemingway✓
(B) Charles Dickens
(C) Huxley (D) Thomas Hardy

91. The oldest monarchy in the world is that of:
(A) Japan✓ (B) Nepal
(C) UK (D) Kingdom of Saudi Arabia

92. The 1st satellite was launched by:
(A) France **(B) USSR✓**
(C) Japan (D) UK

93. Which of the following agencies related to UNO was in existence before the World War II?
(A) WHO (B) FAO
(C) ILO✓ (D) IMF

94. The first SAARC Summit was held at:
(A) New Delhi **(B) Dhaka✓**
(C) Islamabad (D) Male

95. Which is called "Key to the Mediterranean"?
(A) Gibraltar✓ (B) Egypt
(C) Morocco (D) Tunisia

96. Which of the following is known as "Land of White Elephants"?
(A) Netherlands (B) Indonesia
(C) Thailand✓ (D) Belgium

97. "Hansard" is the official verbatim report of the:
(A) British Parliament✓
(B) US Parliament
(C) Swiss Parliament (D) Indian Parliament

98. Who said, "Better to reign in Hell than serve in Heaven?"
(A) Milton✓ (B) William Shakespeare
(C) Tennyson (D) William Wordsworth

99. Vasco de Gama was the native of:
(A) United Kingdom **(B) Portugal✓**
(C) Spain (D) Greece

100. Which country is separated from Ethiopia by the Red Sea?
(A) Jordan (B) Iraq
(C) Kuwait **(D) Yemen✓**

101. The term paper gold is associated with:

(A) Deficit budgeting
(B) **Special drawing rights in international monetary system✓**
(C) Special facility for World Bank
(D) Gold standard

102. Income that is saved and not invested is known as:
(A) Capital (B) **Deposit✓**
(C) Hoarding (D) None of these

103. European Union consists of:
(A) 20 members (B) **28 members✓**
(C) 30 members (D) 25 members

104. KGB was the national security agency of:
(A) Socialist Federal Republic of Yugoslavia
(B) UK
(C) Ukraine (D) **Soviet Union✓**

105. Who was the surgeon who pioneered antiseptic surgery in 1865?
(A) Edward Jenner (B) **Joseph Lister✓**
(C) Henry William (D) John Sleeman

106. "Stare decisis" is essentially the doctrine of:
(A) National security (B) **Precedent✓**
(C) Strategic depth (D) Rule of law

107. Which country is the largest producer of platinum?
(A) **South Africa✓** (B) USA
(C) Russia (D) Canada

108. The country traditionally known for its neutrality?
(A) Sweden (B) **Switzerland✓**
(C) France (D) China

109. Which is the sport most commonly associated with Spain?
(A) Football (B) **Bull Fighting✓**
(C) Archery (D) Baseball

110. London is situated on the bank of river?
(A) Tyne (B) Seine
(C) **Thames✓** (D) Cam

111. The headquarters of OPEC countries is at:
(A) **Vienna✓** (B) Jakarta
(C) The Hague (D) Berlin

112. The only Hindu State in the world is:
(A) Sri Lanka (B) **Nepal✓**
(C) Bhutan (D) India

113. In which year, UNO was established?
(A) 1944 (B) **1945✓**
(C) 1946 (D) 1935

114. Which continent has no desert?
(A) Australia (B) **Europe✓**
(C) Asia (D) Africa

115. Which Pakistani poet got 'Lenin Prize'?
(A) Habib Jalib (B) Ahmad Faraz
(C) **Faiz Ahmad Faiz✓**
(D) None of these

116. When RCD (Regional Cooperation for Development) was replaced by ECO (Economic Cooperation Organization)?
(A) 1982 (B) **1985✓**
(C) 1986 (D) 1990

117. Inflation means that:
(A) Money falls in value (B) **Rises in value✓**
(C) Money becomes scarce
(D) None of these

118. Who among the following is associated with the Theory of Laissez Faire?
(A) **Adam Smith✓** (B) Marshal
(C) Keynes (D) Max Muller

119. America's Cup is associated with which of the following sports?
(A) **Sailing✓** (B) Hockey
(C) Canoeing (D) Tennis

120. Which of the following archeological sites, was discovered in 1955?
(A) **Kot Diji✓** (B) Mohenjo-Daro
(C) Harappa (D) Taxila

121. Which of the following glaciers is located in Karakoram Range?
(A) Siachin (B) Hispar
(C) Biafo (D) **All of these✓**

122. The 'Babusar Pass" connects:
(A) Abbottabad and Gilgit
(B) **Chitral and Gilgit✓**
(C) Gilgit and Hunza (D) Swat and Dir

123. Which of the following fort was built by Mughal Emperor Zaheer-ud-Din Babar in the 16th century A.D?
(A) **Bala Hissar, Peshawar✓**
(B) Rohtas Fort, Jhelum
(C) Ranikot Fort, Hyderabad
(D) Attock Fort, Attock

124. Which of the following districts of Balochistan contains huge deposits of copper?
(A) Loralai (B) Sibbi
(C) Khuzdar (D) **Chaghi✓**

125. Pakistan's first nuclear power plant was setup at Karachi in 1974 with the assistance of:
(A) China (B) France
(C) **Canada✓** (D) North Korea

126. The only national elections held on non-party basis were in:
(A) 1977 (B) **1985✓**
(C) 1988 (D) 1990

127. Who is considered the first poet of Punjabi language?
(A) Bulleh Shah
(B) **Baba Farid Ganj Shakr✓**
(C) Ghulam Farid (D) Sultan Bahu

128. 'Karakoram Highway' in Pakistan is of:
(A) 730 km (B) **804 km✓**
(C) 1170 km (D) 1230 km

129. Cawnpur Mosque tragedy had taken place in:
(A) 1909 (B) 1910
(C) **1913✓** (D) 1915

130. "Mast Tawakli" was a prominent poet of:
(A) **Balochi✓** (B) Pushto
(C) Sindhi (D) Saraiki

131. Which of the following dams is situated at the highest altitude?
(A) **Wall Tan[illegible] Dam** (B) Tanda Dam
(C) Khanpur [illegible]ak Dam

132. Archaeological site "Bhambore" is located in the district of:
(A) Khairpur✓ (B) Dadu
(C) Larkana (D) Thatta

133. Hazrat Baha-ud-Din Zakariya was a prominent sufi saint of:
(A) Suhrawardia order✓
(B) Naqshbandia order
(C) Chistia order (D) Qadiria order

134. Which was the first missile launched by Pakistan?
(A) Hatf✓ (B) Anza
(C) Ghauri (D) Shaheen

135. Pakistan Aeronautical Complex at Kamra was completed with the financial and technical assistance of:
(A) USA (B) Canada
(C) France (D) None of these✓

136. The largest desert of the Pakistan is:
(A) Thar✓ (B) Thal
(C) Cholistan (D) Kharan

137. The oldest barrage on Indus River is:
(A) Guddu Barrage
(B) Sukkur Barrage✓
(C) Ghulam Muhammad Barrage
(D) Taunsa Barrage

138. Pakistan joined World Trade Organization (WTO) in:
(A) 1994 (B) 1995✓
(C) 1997 (D) 2000

139. The National Animal of Pakistan is:
(A) Horse (B) Deer
(C) Dolphin (D) Markhor✓

140. The Federally Administered Tribal Areas (FATA) consist of:
(A) Five Agencies (B) Six Agencies
(C) Seven Agencies✓
(D) Eight Agencies

141. Which of the following institutions was first introduced in the 1973 Constitution?
(A) National Finance Commission
(B) National Economic Council
(C) Council of the Common Interests
(D) All of the above✓

142. On September 9, 1958, Pakistan acquired Gwadar from:
(A) Oman✓ (B) Bahrain
(C) Iran (D) None of these

143. Pakistan China Boundary Agreement was signed on:
(A) February 6, 1961 (B) March 3, 1963✓
(C) March 27, 1965 (D) June 3, 1967

144. Which public holiday is celebrated in the USA on 4 July every year?
(A) New Deal (B) Constitution Day
(C) Independence Day✓
(D) Black Day

145. Which country in the Middle East is the Hashemite Kingdom?
(A) Kuwait (B) Jordan✓
(C) Egypt (D) Syria

146. Which body of people is sometimes referred to as 'the Fourth Estate"?
(A) Senate (B) Judiciary
(C) Executive (D) The Press✓

147. "Kindergarten" refers to?
(A) A children's ward in hospital
(B) A nursery school✓
(C) A small garden
(D) A children's playground

148. The Great Persian Empire was founded by:
(A) Shah Abbas (B) Darius-I
(C) Raza Shah Pehlvi (D) Cyrus the Great✓

149. The place of Persepolis in Iran was destroyed in 331 B.C. by:
(A) Ottoman Turks (B) A flood
(C) Alexander the Great✓
(D) Genghis Khan

150. Mount Logan is the highest peak in which country?
(A) Cuba (B) Canada✓
(C) Portugal (D) Russia

151. In which State of U.S.A is the Harvard University?
(A) Florida (B) California
(C) Massachusetts✓ (D) New York

152. Who among the following is associated with the Theory of Laissez Faire?
(A) Max Muller (B) Adam Smith✓
(C) Marshal (D) Keynes

153. America's Cup is associated with which of the following sports?
(A) Tennis (B) Sailing✓
(C) Hockey (D) Canoeing

154. Which of the following archaeological sites, was discovered in 1955?
(A) Taxila (B) Kot Diji✓
(C) Mahenjo Daro (D) Harappa

155. Which of the following glaciers is located in Karakoram Range?
(A) Biafo (B) Siachin
(C) Hispar (D) All of the above✓

156. The letters in the Urdu language are:
(A) 42 (B) 27
(C) 37✓ (D) 39

157. Which of the following countries has the largest area in the world?
(A) China (B) Canada
(C) U.S.A (D) Russia✓

158. Which of the continents has the lowest population growth rate?
(A) Asia (B) Europe✓
(C) North America (D) Africa

159. Horticulture is the:
(A) Growing of bushes
(B) Cultivation of flowers and fruits✓
(C) Growing of small plants
(D) Cultivation of spices

160. "Dasht-e-Lut" desert is located in:
(A) Iran✓ (B) China
(C) Libya (D) Iraq

161. A country which has no coastline is called:

(A) Landlord Country (B) Balkan Country
(C) Landlocked Country✓
(D) Protectorate Country

162. Which of the following mountains separates Asia from Europe?
(A) Atlas Mountains **(B) Ural Mountains✓**
(C) Hindukush Mountains
(D) Alps Mountains

163. Formosa is the old name of:
(A) Bangkok (B) Cambodia
(C) Rhodesia **(D) Taiwan✓**

164. Pakistan purchased Gwadar from:
(A) Qatar (B) Saudi Arabia
(C) Iran **(D) Oman✓**

165. London is situated on the bank of river:
(A) Thames✓ (B) Delaware
(C) Nile (D) None of these

166. The largest ocean of the world is:
(A) Pacific Ocean✓ (B) Indian Ocean
(C) Arctic Ocean (D) None of these

167. Which of the following sea separates Asia from Africa?
(A) Red Sea✓ (B) Arabian Sea
(C) Yellow Sea (D) None of these

168. Baglihar Dam is constructed in Occupied Kashmir on river:
(A) Ravi (B) Indus
(C) Jhelum **(D) Chenab✓**

169. Pakistan's peacekeeping forces served under United Nations for the first time in:-
(A) Kosovo (B) Sudan
(C) Somalia **(D) Congo✓**

170. Smallest country in Central Asia is:
(A) Turkmenistan **(B) Tajikistan✓**
(C) Kazakhstan (D) Uzbekistan

171. Which of the following countries has the largest number of airports?
(A) USA✓ (B) India
(C) UK (D) China

172. "Easy Jet" is the airline of:
(A) Turkey **(B) UK✓**
(C) Malaysia (D) Spain

173. The name United Nations was coined by:
(A) Austin Mills (B) Stalin
(C) F.D. Roosevelt✓ (D) Winston Churchill

174. Organization of Islamic Cooperation (OIC) was established in:
(A) 1973 (B) 1967
(C) 1969✓ (D) 1971

175. When the stock market is going down, it is called:
(A) Bearish✓ (B) Bullish
(C) Crashing (D) Slumberous

176. "Diego Garcia" is United States 'Naval Base' in:
(A) Atlantic Ocean (B) Pacific Ocean
(C) Arctic Ocean **(D) Indian Ocean✓**

177. "No dynasty lasts more than three generations" is the theory of:
(A) Polybius (B) Imam Ghazali
(C) Herodotus **(D) Ibn-e-Khaldun✓**

178. After U.S, which country is the second largest arms seller in the world?
(A) Germany (B) Britain
(C) Russia✓ (D) France

179. A condominium is:
(A) A particular territory over which joint dominion is exercised by two or more external powers✓
(B) A state of chaos
(C) A state enjoying dominion status
(D) A state with a federal form of government

180. A vassal state is:
(A) A state which is a member of the Commonwealth
(B) One which is completely under the suzerainty of another state✓
(C) A protectorate
(D) None of the above

181. Pinpoint the world's oldest democratic country.
(A) France (B) United States
(C) Great Britain **(D) Greece✓**

182. Identify the wrong statement.
(A) Liver secretes bile
(B) Pancreas secretes insulin
(C) Mammary glands secrete milk
(D) Lachrymal glands secrete saliva✓

183. What is 'Scotland Yard'?
(A) A museum of natural history in U.K.
(B) Royal family's graveyard in England
(C) British Criminal Investigation Department✓
(D) A palace of British Queen in Scotland

184. "Bay of Biscay" is situated between:
(A) Estonia and Latvia
(B) France and Spain✓
(C) Sweden and Finland
(D) Italy and Greece

185. The world's smallest state by area is:
(A) Nauru (B) Monaco
(C) San Marino **(D) Vatican City✓**

186. Which city is the oldest inhabited capital in the world?
(A) Tehran (B) Cairo
(C) Damascus✓ (D) Athens

187. 'Temple Trees' is an official residence of the:
(A) Prime Minister of Sri Lanka✓
(B) King of Nepal
(C) King of Bhutan (D) President of Maldives

188. The famous oil painting "Mona Lisa" is the creation of:
(A) Florence Nightingale
(B) Leonardo da Vinci✓
(C) Pablo Picasso (D) None of the above

189. "Transworld Airways" is an airline of:
(A) Russia (B) U.K.
(C) France **(D) USA✓**

190. Which of the following country's parliament is called 'Cortes'?
(A) Germany (B) Canada
(C) Norway **(D) Spain✓**

191. **The first international organization was:**
(A) League of Nations✓ (B) United Nations
(C) Commonwealth Organization
(D) None of the above

192. **Three Persian Gulf Islands, Abu Mussa, The Greater and Lesser are disputed between:**
(A) Qatar and Bahrain (B) Iran and Iraq
(C) Iran and U.A.E.✓ (D) Iraq and Kuwait

193. **Pope Benedict, the religious leader of Roman Catholic Church belongs to:**
(A) Poland (B) Britain
(C) Germany✓ (D) France

194. **Which of the following countries first introduced paper currency in the world?**
(A) France (B) US
(C) Greece **(D) China✓**

195. **The world's largest copper producer is:**
(A) Russia (B) China
(C) Chile✓ (D) Brazil

196. **"Lion" is the national emblem of:**
(A) Belgium (B) Sri Lanka
(C) Norway **(D) All of the above✓**

197. **The game of 'Hockey' was originated from:**
(A) Greece (B) Pakistan
(C) England✓ (D) Australia

198. **What is "Jingoism"?**
(A) Promotion of peace in the world
(B) Political philosophy of state control over all means of production
(C) Injustice done to the poor segment of society
(D) Extreme nationalism and patriotism✓

199. **The world's most populous city is:**
(A) Tokyo✓ (B) Mexico City
(C) Beijing (D) New York

200. **The longest reigning monarch of the present world is:**
(A) The King of Sweden
(B) The King of Japan✓
(C) The King of Bhutan
(D) The King of Thailand

201. **"Order of the Rising Sun" is the highest military award of:**
(A) UK **(B) Japan✓**
(C) USA (D) Norway

202. **According to Global Dynamism Index (GDI), the world's most dynamic economy is of: -**
(A) Germany (B) America
(C) China **(D) Australia✓**

203. **Which country's economic growth rate is fastest at present?**
(A) Chile (B) Argentina.
(C) China✓ (D) India

204. **"A Tale of Two Cities" is a famous novel of:**
(A) D.H. Lawrence **(B) Charles Dickens✓**
(C) Leo Tolstoy (D) None of these

205. **"Taipei" is the capital of: -**
(A) Taiwan✓ (B) North Korea
(C) South Korea (D) Cambodia

206. **Eiffel Tower is located in:**
(A) Rome (B) London
(C) Paris✓ (D) New York

207. **The largest number of women received Nobel Prize in the category of:**
(A) Physics (B) Peace
(C) Medicine **(D) Literature✓**

208. **Non-Aligned Movement (NAM) was started in:**
(A) 1961✓ (B) 1979
(C) 1980 (D) 1982

209. **The headquarters of International Labour Organization (ILO) is located in:**
(A) Rome **(B) Geneva✓**
(C) Paris (D) New York

210. **The theory of 'Clash of Civilizations' was presented by:**
(A) Samuel P. Huntington✓
(B) Francis Fukuyama
(C) Michael W. Doyle
(D) Fouad Ajmi

210. **The world's largest natural gas deposits are in:**
(A) Brazil (B) US
(C) Russia✓ (D) China

211. **"Petra" is the news agency of:**
(A) Qatar (B) Poland
(C) Syria **(D) Jordan✓**

212. **Britain's secret intelligence service is called:**
(A) MI6✓ (B) Mossad
(C) KGB (D) BIA

213. **In chronological order, which of the following personalities comes first?**
(A) Epicurus (B) Plato
(C) Aristotle **(D) Socrates✓**

214. **Israel snatched 'Golan Heights' in 1967 from:**
(A) Syria✓ (B) Egypt
(C) Lebanon (D) Jordan

215. **"Alexandria" is the seaport of:**
(A) Egypt✓ (B) Greece
(C) Iraq (D) Syria

216. **The largest among the following is:**
(A) A Solar System **(B) Galaxy✓**
(C) The Earth (D) The Sun

217. **'McMahon Line' is a boundary between:**
(A) China and Nepal (B) Germany and Poland
(C) India and Nepal **(D) China and India✓**

218. **The world's oldest National Anthem is of:**
(A) Japan✓ (B) China
(C) Iran (D) Greece

219. **Which of the following international organization has no headquarters?**
(A) D-8 (B) GCC
(C) OAU **(D) G-8✓**

220. **The world's oldest written language is:**
(A) Latin **(B) Chinese✓**
(C) Japanese (D) Cambodian

221. **The world's largest mammal is:**
(A) Whale✓ (B) Tiger
(C) Camel (D) Giraffe

222. **Freetown is the capital of:**
(A) Uganda **(B) Sierra Leone✓**

(C) Senegal (D) Rwanda

223. Which one is not the official language of United Nations?
(A) Russian (B) Spanish
(C) Arabic **(D) German✓**

224. "Kwacha" is the currency unit of:
(A) Chad **(B) Zambia✓**
(C) Peru (D) Cuba

225. The world's first international airline operated its first flight on May 17, 1920 was:
(A) Delta (USA) **(B) KLM (Netherlands)✓**
(C) Aeroflot (Russia) (D) Lufthansa (Germany)

226. Among the SAARC countries, the smallest by area and population is:
(A) Sri Lanka (B) Bhutan
(C) Nepal **(D) Maldives✓**

227. After US, the most Atomic Reactors are in:
(A) France✓ (B) Russia
(C) Japan (D) UK

228. May 31 is observed throughout the world as:
(A) Non Smoking Day✓
(B) Environment Day
(C) Human Rights Day
(D) Press Freedom Day

229. The world's largest wool producing country is:
(A) South Africa (B) China
(C) Russia **(D) Australia✓**

230. Serena Williams is a famous player of:
(A) Badminton (B) Basketball
(C) Tennis✓ (D) Athletics

231. Senkaku Island is disputed between:
(A) Russia and Japan (B) China and Japan
(C) China and South Korea✓
(D) Japan and South Korea

232. The painter of Mona Lisa was:
(A) Henry Smith **(B) Leonardo da Vinci✓**
(C) F.A. Bartholdi (D) None of these

233. The length of the M6 D.G. Khan to Kakkar Motorway is:
(A) 491km **(B) 67 km✓**
(C) 437 km (D) None of these

234. *Shahnama-i-Islam* was written by:
(A) Hafeez Jallundhri✓ (B) Firdausi
(C) Sir Syed Ahmad Khan (D) None of these

235. Headquarter of World Health Organization is located in:
(A) Paris **(B) Geneva✓**
(C) Vienna (D) None of these

236. M-8 Motorway is from:
(A) Ratodero to Gwadar✓
(B) Ratodero to Karachi
(C) Ratodero to Sukkar (D) None of these

237. Which is the longest Motorway in Pakistan?
(A) M9 (B) M5
(C) M2 **(D) M8✓**

238. Pisa Tower is located in:
(A) Poland (B) Germany
(C) Italy✓ (D) France

239. Hezbollah, an Islamic party of Lebanon was established in:
(A) 1987 (B) 1978
(C) 1980 **(D) 1982✓**

240. The capital of Cyprus is:
(A) Valetta **(B) Nicosia✓**
(C) Zagreb (D) None of these

241. Headquarter of Food and Agriculture Organization (established in 1945) is located in:
(A) Vienna **(B) Rome✓**
(C) Geneva (D) None of these

242. Rohtas Fort was constructed by (on Sher Shah's order):
(A) Raja Bir Mal **(B) Todar Mal✓**
(C) Hari Krishan (D) Raja Ram Das

243. Strait of Bosphorous connects:
(A) Black Sea and Sea of Marmara✓
(B) Black Sea and Red Sea
(C) Black Sea and Baltic Sea
(D) None of these

244. Which of the following regions of the world is most thickly populated?
(A) North and South America
(B) East Asia
(C) South Asia✓ (D) North-West Europe

245. Damascus is situated on the bank of:
(A) Barada River✓ (B) Rhine River
(C) Nile River (D) None of these

246. Paris is situated on the bank of:
(A) Rhine River **(B) Seine River✓**
(C) Spree River (D) None of these

247. The foreign phrase *De fecto* means:
(A) Argument against
(B) Rightful
(C) In fact✓ (D) None of these

248. Mt. Arartat is the longest peak of:
(A) Chile (B) Britain
(C) North Korea **(D) Turkey✓**

249. Dome of Rock is located in:
(A) Iraq **(B) Jerusalem✓**
(C) Lebanon (D) Jordan

250. Abyssinia is the old name of which of the following countries?
(A) Ceylon (B) Malaya
(C) Ethiopia✓ (D) Rhodesia

(A) Elbe (B) Ottawa
(C) Angora✓ (D) Avon

252. Who is the founder of Taoism?
(A) Hung Fe (B) Lun Yu
(C) Tao-te-Cheng✓ (D) Lao-tse

253. Bhutan is known as:
(A) Land of thunderbolt✓
(B) Land of rivers
(C) Land of pagodas
(D) Land of the flying fish

Pakistan Studies:

Pakistan Basic Facts

Official Name	Islamic Republic of Pakistan
Father of the Nation	Quaid-i-Azam Muhammad Ali Jinnah
President	Dr. Arif Alvi (9.9.2018)
Prime Minister	Imran Khan (18.8.2018)
Capital	Islamabad
Area	796,096 sq. km. (307,374 sq. mi) Punjab 205,345 Sindh 140,914 Khyber Pakhtunkhwa 74,521 Balochistan 347,190 Federally Administered Tribal Areas 27,220 Islamabad(Capital) 906
Population	212.72 million (2019)
Ethnic Composition	96.4% Muslims, 3.6% Other Minorities (Hindus, Christians, Sikhs, Ahmadis, Buddhists, Kalash, Bahais, Zoroastrians, Atheists etc.)
Per Capita Income	US$ 1641 (2019)
Currency	Pak Rupee
Exports	Cotton, textile goods, rice, leather items, carpets, sports goods, fruits, handicrafts, sea food (Fisheries)
Imports	Industrial equipment, vehicles, iron ore, petroleum, edible oil
Languages	Urdu (National language), English (Official) & other Languages include: Sindhi, Punjabi, Balochi, Pushto, Hindku, Kashmiri, Potohari, Brahvi, Balti, Seraiki, Shina, etc.
Languages Percentage	Punjabi = 48% Sindhi = 12% Seraiki = 10% Urdu = 8% Pushto = 8% Balochi = 3% Hindku = 2% Brahvi = 1% English & Other Languages = 8% [A total of 77 languages are spoken in Pakistan 72 of them are ancient local languages. 35% of languages face multi-natural threats of extinction)]
Literacy Rate	62 (2019)
Government	Parliamentary form
Parliament	It consists of two Houses i.e., the Senate (Upper House) and the National Assembly (Lower House). The Senate is a permanent legislative body and symbolises a process of continuity in the national affairs. It consists of 104 members. The four Provincial Assemblies, Federally Administered Tribal Areas (FATA) and Federal Capital form its electoral college. The National Assembly comprises of a total number of 342 seats, out of which 272 are general, 60 reserved for women and 10 non-Muslim seats.
Federal Ombudsman	Also called "Wafaqi Mohtasib" with its Headquarters in Islamabad and Regional Offices in Lahore, Sukkur, Quetta, Faisalabad, Multan, Dera Ismail Khan, Peshawar and Karachi. Federal Ombudsman started functioning on 8th August, 1983.
Pakistan National Flag	Dark green with a white vertical bar, a white crescent and a five-pointed star in the middle. The flag symbolises Pakistan's profound commitment to Islam and Islamic world.
National Anthem	Approved in June 1954 Verses composed by Abul Asar Hafeez Jullundhri. Tune Composed by: Ahmed G. Chagla. Duration: 80 seconds

	Cedrus Deodara (Deodar)
...tional Dress	Shalwar Kameez
...tional Juice	Sugarcane Juice
...tional Sweetmeat	Gulab Jaman
...tional Bird	Chukor
...tional Mammal	Indus River Dolphin
...tional Slogan	Pakistan Zinda Bad
...tional Game	Hockey
...tional Poet	Allama Iqbal
...tional Animal	Markhor
...te Emblem	The State Emblem consists of: The crescent and star which is symbol of Islam. The shield in the centre shows four major crops. Wreath surrounding the shield represents cultural heritage. Scroll contains Quaid's motto: Unity, Faith, Discipline.
...ional Flower	Jasmine
...ional Fruit	Mango (Summer), Guava (Winter)
...ra	Pine, Oak, Poplar, Maple, Mulberry
...na	The Pheasant, Leopard, Deer, Ibex, Chinkara, Black Buk, Neelgai, Markhor, Marcopolo Sheep, Green turtles, River and Sea Fish, Crocodile, Water Fowls
...ular Games	Cricket, Hockey, Football, Billiards, Snooker, Volleyball, Tennis Badminton, Kabbadi, Wrestling
...rist Resorts	Murree, Quetta, Hunza, Ziarat, Swat, Kaghan, Chitral, Gilgit, Skardu, Kalam, Naran, Khyber Pass, Lahore, Islamabad, Neelam Valley, Shandur Pass, Shangrila, Kalash
...haeological Sites	Moenjodaro, Harappa, Taxila, Kot Diji, Mehrgarh, Thatta, Amri, Rehman Dheri, Soan Valley, Rohtas Fort
...ior Cities	Islamabad, Karachi, Lahore, Peshawar, Quetta, Rawalpindi, Hyderabad Multan, Sialkot, Faisalabad, Gujranwala, Sukkur, Gujrat, Bahawalpur, Gilgit.
...riculture	Major crops are cotton, wheat, rice and sugarcane
...al Cropped Area	22.14 million hectares
...ustry	Textiles, cement, fertiliser, steel, sugar, electric goods, shipbuilding
...mbers of Commerce & Industry	37
...rgy	Major sources: Oil, Coal, Hydel, Thermal, Nuclear and Liquid Petroleum Gas WAPDA's total installed power generating capacity: 22,797 MW CNG Stations: 3331
...lth	Hospitals: 1207, Dispensaries: 5,382 Doctors (registered): 1,67,759 Dentists (registered): 13,716 Nurses (registered): 86,183
...ication	Primary schools: 1,63,000 Middle schools: 41,456 High schools: 24,822 Arts & science colleges: 1,500 Professional colleges: 161 Universities: 203 (2014)
...nsport & Communication	Total length of roads: 2,63,775 km Pakistan Railways network: 7,791 km Railway stations: 781 Pakistan International Airlines: Covers 30 international and 23 domestic stations. Major Airports: 13 - Islamabad, Karachi, Lahore, Quetta, Peshawar, Rahim Yar Khan, Sialkot, Multan, Faisalabad, Gwadar, Bahawalpur, Turbat, DG Khan. International : 3 - Karachi, Gwadar and Bin Qasim Domestic: 2 - Minora

	and Pasni
Communications	Post offices: 13,000, telephone connections: 7.38 million, public call offices: 10,000, mobile phone connections: 15 crore 70 lac. Mobile Phone users: 7 crore.
Employment	Total labour force: 52.7 million, Agriculture Sector: 45.1%, Manufacturing & Mining Sector: 13%, Others: 41.9%
Media	*a. Print Media* Dailies: 424 Weeklies: 718 Fortnightlies: 107 Monthlies: 553 *b. News Agencies* APP (official) PPI & NNI (Pvt.) *c. Electronic Media* Pakistan Television: Six TV centres at Islamabad, Lahore, Peshawar, Quetta, Karachi & Multan covering 90% population. Registered TV sets: 3,759,800 Viewership: 115 million Radio Stations: Total 25, Home services in 20 languages. External services cover 70 countries in 15 languages F.M. Radio Stations: 188
Banks	**Central Bank:** State Bank of Pakistan **Other Banks:** National Bank of Pakistan, Habib Bank Ltd., Muslim Commercial Bank Ltd., Allied Bank of Pakistan Ltd., First Woman Bank, Mehran Bank, Bank of Punjab, United Bank Ltd., Sindh Bank Ltd. **Specialised Banks:** Agricultural Development Bank of Pakistan, Federal Bank for Co-operatives, Industrial Development Bank of Pakistan, The Punjab Provincial Co-operative Bank, Banker's Equity and National Development Finance Corporation **First Islamic Bank:** Meezan Bank Ltd. **Islamic Banks:** 6 entire, 12 general banks, 1300 branches in 87 cities. [In 2001, Islamic banking system started in Pakistan]. **Islamic Bank Braches:** 2322 **Total Banks:** 38 **Foreign Banks:** 7 **Commercial Banks Branches:** 8,886
Micro-Finance Banks	Khushhali Bank Ltd; The First Micro-Finance Bank Ltd; Tameer Micro-Finance Bank Ltd; Pak-Oman Micro-Finance Bank Ltd; Rozgar Micro-Finance Bank Ltd; Network Micro-Finance Bank Ltd; Finca Micro-Finance Bank Ltd
Famous Mountain Peaks	K-2 (Mt. Godwin Austin): 28,250 ft/8611 m (2nd in World) Nanga Parbat : 26,660 ft./8126 m (8th in World) Gasherbrum-1: 26,470 ft/8068 m (llth in World)
Famous Mountain Passes	The Khyber Pass The Kurram Pass The Tochi Pass The Gomal Pass The Bolan Pass The Lowari Pass
Rivers	The Indus 3896 km Jhelum 825 km Chenab 1242 km Ravi 901 km Sutlej1551 km Beas (Tributary of Sutlej) 398 km
Famous Glaciers	Siachin 75 km Batura 55 km Baltoro 62 km
Deserts	Thar: (Sindh) Cholistan: (Punjab) Thal: (Punjab)
Lakes	Manchar Sindh Keenjar Sindh

	Hanna Balochistan Saif-ul-Maluk Khyber Pakhtunkhwa Satpara Gilgit-Baltistan Kachura Gilgit-Baltistan
Major Dams	Mangla Dam Punjab Tarbela Dam Khyber Pakhtunkhwa Warsak Dam Khyber Pakhtunkhwa
National Debt	649.1 billion rupees (Jan. 2019)

GEOGRAPHICAL LOCATION

Pakistan is an important Muslim Republic of South Asia. It is located between the latitudes of 23°30' and 36°45' north and between the longitudes of 61° and 75°31' east.

Q. ***What is the length of Pakistan's common boundaries with its neighbours?***

Ans. Pakistan shares 595 km long border with China in the north, 2252 km long border (Durand Line) with Afghanistan in the North West, 805 km long boundary with Iran in South West and 1610 km long border with India in the East. The southern border of Pakistan consists of 700 kilometres long coastline which runs along the Arabian Sea from the border of Iran in the West to the Rann of Kutch in the East.

PHYSICAL FEATURES

Pakistan is a large country. It stretches over 1600 kms north to south and about 800 kms broad east to west covering an area of 796,096 square kms. Pakistan is divided into the following six types of natural regions:

(i) The Northern Mountain Ranges
(ii) The Western Mountain Ranges
(iii) The Salt Range and Pothwar Plateau
(iv) The Baluchistan Plateau
(v) The Indus Plain
(vi) The Coastal Region

(i) The Northern Mountain Ranges

The northern mountain ranges consist of the Himalaya mountains, the Karakoram mountains and the Hindukush mountains. The Himalayas lie towards the north and have an average height of 7000 metres. Nanga Parbat is the highest peak of this range with a height of 8126 metres/26660 feet. The Karakoram mountains guard the western side of Pakistan. K-2 (8611 metres/28250 feet) is the highest peak of Karakoram mountains. Renowned Karakoram Highway which connects Pakistan with China passes through this range. The Hindukush mountains cover the North West side of Pakistan. Its major portion lies in Afghanistan.

(ii) The Western Mountain Ranges

Pakistan's western mountain ranges consist of Koh-i-Sufaid, Waziristan hills, Sulaiman mountains and Kirthar hills.

(iii) The Salt Range and Pothwar Plateau

The salt range lies on the west bank of river Jhelum and runs from Bakralla hills to the Sulaiman Range.

(iv) The Baluchistan Plateau

The Baluchistan Plateau lies west of the Sulaiman and Kirthar hills. It has an average height of 600 to 900 metres.

(v) The Indus Plain

The Indus plain consists of the belt which stretches from the salt range in the north to the Arabian Sea in the South. This plain is irrigated by the Indus River.

(vi) The Coastal Region

Pakistan shares a 700 km long coastline with the Arabian Sea.

Q. ***Which is the highest peak of Pakistan?***

Ans. K-2 is the highest peak with a height of 8611 metres/28250 feet.

Q. ***What is the Karakoram Highway?***

Ans. Karakoram Highway is the land route which connects Pakistan with China through the

Karakoram mountains.

Q. ***What is the height of Nanga Parbat and Tirich Mir Peaks?***

Ans. Nanga Parbat (8126 metres/26660 feet); Tirich Mir (7700 metres/25260 feet).

Q. ***Give the location of Soan Valley.***

Ans. The Soan Valley is located in the salt range which lies between the Jhelum and Indus River in the northern Punjab.

DIVISIONS AND DISTRICTS

Politically Pakistan consists of four provinces (Punjab, Sindh, NWFP, Baluchistan), Tribal Areas and Federally Administered Area of Islamabad. The country is divided into the following 28 divisions and 118 districts. In addition, the FATA comprises of 13 Tribal Areas which cover 27220 sq. kms.

Sr.#	Province	Divisions	Districts
1.	Punjab	9	36
2.	Sindh	6	24
3.	KP	8	25
4.	Baluchistan	6	32
5.	Islamabad	-	1
Total	PAKISTAN	29	118

Note: *(i) On 3rd Nov. 2008, Sahiwal was made the 9th division of Punjab.*

(ii) On 26th Jan, 2009, Chiniot was made the 36th district of Punjab Province. It was inaugurated on July 1, 2009.

(iii) On 28th Jan., 2011, a new district "Torghar" was established in KP.

(iv) On 12th Oct. 2013, Sindh Government divided Thatta District into 2 parts, with the new district of "Sujawal".

(vi) Sindh Government created a new Bhambhore Division comprising Thatta, Sujawal and Badin Districts on April 24, 2014.

(i) Divisions and Districts of Punjab

Sr. No.	Divisions	Names of Districts	Total Districts
1.	Lahore	Lahore, Kasur, Sheikhupura, Nankana	4
2.	Rawalpindi	Rawalpindi, Attock, Jhelum, Chakwal	4
3.	Faisalabad	Faisalabad, Jhang, Toba Tek Singh, Chiniot	4
4.	Sargodha	Sargodha, Mianwali, Khushab, Bhakkar	4
5.	Gujranwala	Gujranwala, Sialkot, Gujrat, Narowal, Hafizabad, Mandi Bahauddin	6
6.	Multan	Multan, Vehari, Khanewal, Lodhran	4
7.	Bahawalpur	Bahawalpur, Bahawalnagar, Rahimyar Khan	3
8.	D.G. Khan	Dera Ghazi Khan, Rajanpur, Liah, Muzaffargarh	4
9.	Sahiwal	Sahiwal, Pakpattan, Okara	3
TOTAL			36

(ii) Divisions and Districts of Sindh

Sr. No.	Divisions	Names of Districts	Total Districts
1.	Karachi	Karachi	1
2.	Sukkur	Sukkur, Khairpur, Ghotki, Naushero Feroze	4
3.	Hyderabad	Shaheed Benazirabad, Hyderabad, Dadu, Tando Allahyar, Tando Muhammad Khan, Matiari, Jamshoro,	7
4.	Larkana	Larkana, Jacobabad, Shikarpur, Kamber Shahdadkot, Kashmore	5
5.	Mirpurkhas	Mirpurkhas, Thar, Sanghar, Umerkot	4
6.	Bhambhore	Thatta, Sujawal, Badin	3
TOTAL			24

(iii) Divisions and Districts of KP

Sr. No.	Divisions	Names of Districts	Total Districts
1	Peshawar	Peshawar, Nowshehra	2

Sr. No.	Divisions	Names of Districts	Total Districts
1	Kohat	Kohat, Karak, Hangu	3
2	D.I. Khan	Dera Ismail Khan, Tank	2
3	Malakand	Malakand, Swat, Chitral, Buner, Shangla, Upper Dir, Lower Dir	7
4	Hazara	Abbottabad, Haripur, Mansehra, Batagram, Kohistan, Torghar	6
5	Mardan	Mardan, Charsadda, Swabi	3
6	Bannu	Bannu, Lakki Marwat	2
7 TOTAL			25

(iv) Divisions and Districts of Baluchistan

Sr.No.	Divisions	Names of Districts	Total Districts
1	Quetta	Quetta, Pishin, Chaghai, Qilla Abdullah, Noshki	5
2	Kalat	Kalat, Khuzdar, Lasbella, Kharan, Mastung, Awaran, Washuk	7
3	Sibi	Sibi, Dera Bugti, Kohlu, Ziarat, Harnai, Lehri	6
4	Zhob	Sherani, Musakhail, Zhob, Loralai, Barkhan, Qilla Saifullah	6
5	Naseerabad	Naseerabad, Kachi, Jafarabad, Jhal Magsi, Sohbatpur	5
6	Makran	Kech, Panjgur, Gwadar	3
TOTAL			32

FEDERALLY ADMINISTERED TRIBAL AREAS (FATA)

(Population according to 1998 Census)

Sr.#	Names of Tribal Areas	Area in Sq. kms	Population
1	Peshawar Tribal Area	261	53,841
2	Kohat Tribal Area	446	88,456
3	D.I. Khan Tribal Area	3229	38,990
4	Bannu Tribal Area	877	19,593
5	Bajaur Agency	1290	595,227
6	Kurram Agency	3380	448,310
7	Mohmand Agency	2296	334,453
8	Khyber Agency	2776	546,730
9	N. Waziristan Agency	4707	361,246
10	S. Waziristan Agency	6620	429,841
11	Orakzai Agency	1538	225,441
12	Lakki Marwat Tribal Area	-	6,987
13	Tank Tribal Area	-	27,216
TOTAL		27220	3,176,331

FEDERAL CAPITAL ISLAMABAD

Population according to 1998 Census (E)

Sr.No.	*Name of District*	*Area in Sq.kms*	*Population*
1	Islamabad	906	805,000
TOTAL		906	805,000

Q. *What is the number of districts in Punjab, Sindh, KP and Baluchistan provinces?*

Ans. There are 36 districts in Punjab, 24 districts in Sindh, 25 districts in KP and 32 districts in Baluchistan Province.

AREA

Pakistan covers an area of 796096 sq.km.

Sr.No.	Names of Province	Area in Sq.km.	Percentage of Total Area
1	Punjab	205,345	25.8
2	Sindh	140,914	17.7
3	KP	74,521	9.4
4	Baluchistan	347,190	43.6
5	Islamabad	906	0.1
6	FATA	27,220	3.4
TOTAL		796,096	100.0

Q. ***Which is the largest province of Pakistan in respect of area?***
Ans. Baluchistan is the largest province of Pakistan with an area of 347190 sq. kms. Punjab ranks second with 205,345 sq. kms.

Q. ***Which is the smallest province of Pakistan in respect of area?***
Ans. KP is the smallest province with an area of 74521 square kilometres.

Q. ***Give the areas of FATA and Federal Area of Islamabad.***
Ans. FATA covers 27220 square kms. whereas the Federal area of Islamabad extends over 906 sq. kms.

Expected Questions FOR COMING EXAMS.

1. **Sahibzada Abdul Qayyum (1863-1937) had rendered great services for the educational uplift of the Muslims of:**
(A) Punjab (B) Sindh
(C) NWFP (now KP)✓ (D) Balochistan

2. **The Central Muhammadan Association was founded in 1877 by:**
(A) Chaudhri Rehmat Ali
(B) Sir Syed Ahmad Khan
(C) Syed Ameer Ali✓
(D) Mohsin-ul-Mulk

3. **Under which act, the Muslims' demand of 'Separate Electorate' was first conceded by the British Government?**
(A) The Indian Councils Act, 1892
(B) The Indian Councils Act, 1909✓
(C) The Government of India Act, 1919
(D) The Government of India Act, 1935

4. **The constitution of the All India Muslim League was drafted by a Committee in 1907 headed by:**
(A) Nawab Viqar-ul-Mulk
(B) Nawab Mohsin-ul-Mulk
(C) Maulana Muhammad Ali Jauhar✓
(D) Justice Shah Din

5. **Which of the following amendments were proposed by Quaid-i-Azam in the Nehru Report 1928, to make it acceptable to the Indian Muslims?**
(A) The Muslims should be given one third representation in the Central Legislature
(B) For ten years, the Muslims should be represented in Punjab and Bengal according to their population
(C) Residuary powers should be given to the provinces
(D) All of the above✓

6. **Maulana Muhammad Ali Jauhar had started publishing his famous English Newspaper "Comrade" from the year:**
(A) 1911✓ (B) 1913
(C) 1922 (D) 1925

7. **What was the significances of 21st Annual Session of All India Muslim League?**
(A) Quaid-i-Azam presented Fourteen Points
(B) Allama Iqbal delivered Allahabad Address✓
(C) Lahore Resolution was passed
(D) Quaid-i-Azam was elected as permanent President of All India Muslim League

8. **Which of the following leaders helped Quaid-i-Azam in the preparation of his Fourteen Points in 1929?**
(A) Maulana Muhammad Ali Jauhar✓
(B) Maulana Shaukat Ali
(C) Liaquat Ali Khan

(D) Maulana Hasrat Mohani

9. **Under Gandhi-Irwin Pact of 5th March 1931, it was decided that:**
(A) The System of Dyarchy will be abolished
(B) The System of Separate Electorate will be retained for the Muslims
(C) Congress will represent low caste Hindus in the elected bodies
(D) **The Congress will call off its Civil Disobedience Movement✓**

10. **In the Provincial Elections of 1937, All India Muslim League won largest number of seats in the:**
(A) **United Provinces (UP)✓**
(B) Sindh Province
(C) Punjab Province
(D) Central Provinces (CP)

11. **The Indian Muslims observed 'Day of Deliverance' after the RESIGNATION of Congress Ministries on:**
(A) 12 September, 1939
(B) 22 September, 1939
(C) 12 December, 1939
(D) **22 December, 1939✓**

12. **Chaudhri Rehmat Ali first used the word 'Pakistan' in his pamphlet 'Now or Never' in:**
(A) **1933✓** (B) 1935
(C) 1937 (D) 1938

13. **When did Quaid-i-Azam say that "Hindu India and Muslim India parted and parted forever"?**
(A) When Congress launched non-cooperation movement in 1920
(B) **When Congress rejected his proposed modification in the Nehru Report 1928✓**
(C) After failure of Third Round Table Conference in 1932
(D) Whe the Lahore Resolution was passed on 23rd March 1940

14. **By "Satyagraha", Gandhi appealed for:**
(A) Boycotting English/foreign goods
(B) Hunger strike till death
(C) **Civil disobedience✓**
(D) Social ostracism

15. **Lahore Resolution of 23rd March 1940, was seconded from Sindh Province by:**
(A) Begum Maulana Muhammad Ali Jauhar
(B) Chaudhri Khaliq-uz-Zaman
(C) **Abdullah Haroon✓**
(D) Nawab Muhammad Ismail

16. **Congress launched "Quit India Movement" against the British Government in:**
(A) 1940 (B) 1941
(C) **1942✓** (D) 1944

17. **Who presided over the Simla Conference in 1945?**
(A) Lord Minto
(B) **Lord Wavell✓**
(C) Lord Irwin
(D) Lord Mountbatten

18. **In the Interim Government of 1946, the Minister of Health was:**
(A) Sardar Abdur Rab Nishtar
(B) Jag Jivan Ram
(C) Asif Ali
(D) **Ghazanfar Ali Khan✓**

19. **After Sir Agha Khan, the next President of All India Muslim League was:**
(A) Viqar-ul-Mulk
(B) Maulana Zafar Ali Khan
(C) **Raja Sahib of Mahmoodabad✓**
(D) Mian Muhammad Shafi

20. **The Hindus had launched 'Swadeshi Movement" (to boycott English made goods) in the wake of:**
(A) The Urdu-Hindi Controversy 1867
(B) **Partition of Bengal 1905✓**
(C) Jallianwala Bagh Tragedy 1919
(D) All of the above

21. **The Pirpur Report on the brutalities of the Congress Ministries 1937-39, was compiled by:**
(A) A.K. Fazl-ul-Haq
(B) **Raja Muhammad Mehdi✓**
(C) Nawab Salim Ullah Khan
(D) M. Sharif

22. **The British parliament passed Indian Independence Act on:**
(A) **3 June 1947✓** (B) 14 June 1947
(C) 14 July 1947 (D) 24 July 1947

23. **Which of the following leaders had translated the Lahore Resolution from English to Urdu on 23rd March 1940:**
(A) **Maulana Zafar Ali Khan✓**
(B) Chaudhri Khaleeq-uz-Zaman
(C) Dr. Muhammad Alam
(D) Sir Sikandar Hayat

24. **The first Urdu newspaper (Daily) published after the creation of Pakistan was:**
(A) Mashriq (B) **Imroze✓**
(C) Watan (D) None of these

25. **The first foreign head of the state visited Pakistan after independence was the President of:**
(A) India (B) **Indonesia✓**
(C) Iran (D) China

26. **Sahibzada Abdul Qayyum (1863-1937) had rendered great services for the educational uplift of the Muslims of: -**
(A) Balochistan (B) Punjab
(C) Sindh (D) **N.W.F.P. ✓**

27. **Kanpur Mosque Tragedy had taken place in:**
(A) 1915 (B) 1909
(C) 1910 (D) **1913✓**

28. **On July 9, 1950, Pakistan became a member of:**
(A) Paris Club
(B) IMF
(C) World Bank
(D) **None of the above✓**

29. Decimal System was introduced in Pakistan on First January:
(A) 1963 (B) 1951
(C) 1959 **(D) 1961✓**

30. On July 9, 1948, Pakistan issued its first: -
(A) Postal Stamp✓ (B) Coin
(C) Currency Note
(D) All of the above

31. The first Princely State to accede to Pakistan after partition was: -
(A) Kalat (B) Swat
(C) Hunza **(D) Bahawalpur✓**

32. The designation of Governor-General was changed to President in:
(A) 1959 **(B) 1956✓**
(C) 1957 (D) 1958

33. Name the Chief Minister of Sindh from August 1947 to April 1948.
(A) Noor Talpur (B) Nisar Khoro
(C) Ayub Khoro✓ (D) Rahim Talpur

34. Who was the first Chief Minister of Khyber Pakhtunkhwa?
(A) Dr. Ali Khan
(B) Khan Abdul Qayyaum Khan
(C) Dr. Khan Sahib✓
(D) Abdur Rehman Hoti

35. M.A.O College of Aligarh got the status of University in:
(A) 1920✓ (B) 1917
(C) 1918 (D) 1919

36. Name the person who took part in all three Round Table Conferences of 1930-32 and was the first Foreign Minister of Pakistan.
(A) Sir Muhammad Zafarullah✓
(B) Chaudhary Muhammad Ali
(C) Sikandar Mirza
(D) Ghulam Muhammad

37. Name the first Governor of Sindh from August 1947 to October 1948:
(A) Hamida Khoro
(B) Ghulam Hussain Hidayatullah✓
(C) Nabi Baksh Talpur
(D) None of them

38. Name the first Governor of NWFP from August 1947 to April 1948.
(A) Sir George Cunningham✓
(B) Sir Francis Moody
(C) Allan Perry Keane
(D) Sir Francis Messervy

39. The origin of the idea of Pakistan is associated with the name of:
(A) Liaquat Ali Khan
(B) Sir Syed Ahmad Khan
(C) Allama Iqbal✓
(D) Quaid-e-Azam

40. Khilafat Movement was launched in the Subcontinent in:
(A) 1920 (B) 1917
(C) 1918 **(D) 1919✓**

41. The first President of the All India Muslim League was:
(A) Nawab Mohsin-ul-Mulk
(B) Nawab Saleemullah
(C) Sir Agha Khan✓
(D) Nawab Viqar ul Mulk

42. Name the educational institution founded by Sahibzada Abdul Qayyum in Khyber Pakhtunkhwa (former NWFP).
(A) Frontier University
(B) Peshawar College
(C) Islamia High School Peshawar
(D) Islamia College Peshawar✓

43. Who was the Prime Minister of Great Britain when the Partition Plan was announced in 1947?
(A) Attlee✓ (B) Churchill
(C) Stanley Baldwin (D) Anthony Eden

44. By the end of August 1947, all the Hindu majority states had acceded to India except:
(A) Hyderabad (B) Junagarh
(C) Both of them✓ (D) None of them

45. Who was the first Governor of Punjab?
(A) Sardar Abdur Rab Nishtar
(B) Francis Moody✓
(C) Mian Amin-ud-Din
(D) I.I. Chundrigar

46. Who was Punjab's first Inspector General, Police?
(A) Mian Anwar Ali
(B) A.B. Awan
(C) S.N. Alam
(D) Qurban Ali Khan✓

47. The Congress and the Muslim League boycotted the Simon Commission. Who led the breakaway section of the Muslim League, which supported the Simon Commission?
(A) Mian Barkat Ali
(B) Mian Ejaz Shafi
(C) Mian Muhammad Shafi✓
(D) Mian Ahmad Ali

48. In 1932, the British Prime Minister announced the Communal Award granting separate electorate to the depressed classes. Name the British Prime Minister.
(A) C. Attlee
(B) Harold McMillan
(C) Winston Churchill
(D) Ramsay Macdonald✓

49. When Chaudhry Rehmat Ali issued the pamphlet "Now or Never" in 1933, where was he studying?
(A) Harvard **(B) Cambridge✓**
(C) Oxford (D) Aligarh

50. In 1911, on the occasion of his coronation at the Delhi Darbar, King George V announced the:
(A) Annulment of partition of Bengal✓
(B) Partition of Bengal
(C) Separate electorate

(D) None of these

51. The Jallianwala massacre took place in:
(A) April 1920 (B) April 1919✓
(C) December 1919 (D) April 1921

52. An Interim Government was formed in India in 1946, who was the Prime Minister of the Interim Government?
(A) Liaqat Ali Khan
(B) Jawaharlal Nehru
(C) Lord Wavell
(D) None of them✓

53. When was the Kashmir issue taken to the United Nations by India?
(A) 1 Jan 1948✓ (C) 11 Nov 1947
(D) 16 Dec 1947 (B) None of these

54. The three Round Table Conferences were held in London during ________
(A) 1935 - 1937 (B) 1929 - 1931
(C) 1928 – 1930 (D) 1930 – 1932✓

55. Allama Iqbal gave his idea of a country for Indian Muslims in December 1930 at ________.
(A) Delhi (B) Lucknow
(C) Abbottabad (D) Allahabad✓

56. Who was the first Prime Minister of Pakistan?
(A) Hussain Shaheed Suharwardy
(B) I.I. Chundrigar
(C) Liaqat Ali Khan✓
(D) Ghulam Muhammad

57. Who was the first President of the Islamic Republic of Pakistan?
(A) Iskandar Mirza✓
(B) Sardar Abdur Rab Nishtar
(C) Ch. Muhammad Zafarullah
(D) Ayub Khan

58. Maulana Muhammad Ali Johar was ________.
(A) Islamic Scholar (B) Politician✓
(C) Preacherr (D) Poet

59. All Indian Muslim League was founded in ________.
(A) 1906 in Dhaka✓
(B) 1908 in Calcutta
(C) 1903 in Chittagong
(D) 1900 in Lahore

60. The first Constitution of Pakistan was promulgated on ________.
(A) 20 January 1954
(B) 21 March 1956
(C) 23 March 1956✓
(D) 7 October 1958

61. Quaid-e-Azam Muhammad Ali Jinnah was born in ________.
(A) 1881 (B) 1878
(C) 1870 (D) 1876✓

62. Lucknow Pact was signed between Congress and Muslim League in ________.
(A) 1916✓ (B) 1920
(C) 1918 (D) 1922

63. Quaid-e-Azam Muhammad Ali Jinnah remained the Governor General of Pakisan for almost:
(A) 13 months✓ (B) 11 months
(C) 12 months (D) 10 months

64. Which area of Punjab with Muslim majority was awarded to India by the Boundary Commission in 1947?
(A) Hoshiarpur (B) Jalandhar
(C) Amritsar (D) Ferozepur✓

65. Quaid-e-Azam Muhammad Ali Jinnah started his law practice in:
(A) Kolkata (B) Bombay✓
(C) Delhi (D) Karachi

66. Quaid-e-Azam Muhammad Ali Jinnah was sworn in as the Governor General of Pakistan on:
(A) 17th August 1947
(B) 15th August 1947✓
(C) 16th August 1947
(D) 14th August 1947

67. The All India Muslim League was founded in 1906 in:
(A) Allahabad (B) Dhaka✓
(C) Lahore (D) Delhi

68. Who succeeded Quaid-e-Azam Muhammad Ali Jinnah as the Governor General of Pakistan?
(A) Muhammad Ali Bogra
(B) Liaquat Ali Khan
(C) Sikandar Mirza
(D) Khawaja Nazimuddin✓

69. Which of the following leaders took part in Presidential Election?
(A) Mohtarma Fatima Jinnah✓
(B) Begum Qazi Esa
(C) Begum Liaqat Ali Khan
(D) Shaista Ikramullah

70. In 1906, the Muslim League was founded at:
(A) Allahabad (B) Karachi
(C) Dacca✓ (D) Lahore

71. Who was the first Chief Justice of Pakistan?
(A) M.R. Kiyani
(B) Maulvi Tamiz-ud-Din
(C) Mian Abdul Rashid✓
(D) A.R. Cornelius

72. Mohtarma Fatima Jinnah was a ________ by profession.
(A) Dentist✓ (B) Lawyer
(C) Economist (D) Doctor

73. Who is called "Sher-e-Bengal" amongst the following leaders?
(A) Nawab Waqar-ul-Mulk
(B) A.K. Fazal-ul-Haq✓
(C) Ch. Khaleez-uz-Zaman
(D) Sh. Mujeeb-ur-Rehman

74. In 1930, the first Round Table Conference was held in:

(A) Dehli (B) Simla
(C) London✓ (D) Lahore

75. Quaid-e-Azam presented his Fourteen Points in response to:
(A) Nehru Report✓
(B) Lucknow Pact
(C) Quit India Movement
(D) 3rd June Plan

76. Quaid-e-Azam joined Muslim League in:
(A) 1916 (B) 1914
(C) 1911 **(D) 1913✓**

77. Who was the first Governor of State Bank of Pakistan?
(A) Rashid Naqvi
(B) Saeed Hamid
(C) Zahid Hussain✓
(D) Ishrat Kamal

78. Who composed the verses of the National Anthem?
(A) Ab'ul Asar Hafeez Jullundhri✓
(B) Josh Malih Abadi
(C) Ahmad Nadim Qasmi
(D) Faiz Ahmad Faiz

79. Who presented the National Flag for formal approval to the Constituent Assembly on 11th of August, 1947?
(A) Liquat Ali Khan✓
(B) Muhammad Ali Bogra
(C) Fazl-e-Haque
(D) Quaid-e-Azam

80. Who was the Viceroy of India from 1889 to 1905?
(A) Lord Attlee
(B) Mountbatten
(C) Lord Irwin
(D) Lord Curzon✓

81. To reconcile Hindus and Muslims, a new religion Din-i-Ilahi was introduced by:
(A) Akbar✓ (B) Humayun
(C) Jahangir (D) Babur

82. Who was the leader of "Quit India Movement"?
(A) Sir Syed Ahmed Khan
(B) Maulana Muhammad Ali Jauhar
(C) Mahatma Gandhi✓
(D) Muhammad Ali Jinnah

83. Objectives Resolution was presented by:
(A) Sardar Abdur Rab Nishtar
(B) Quaid-i-Azam Muhammad Ali Jinnah
(C) Liaqat Ali Khan✓
(D) Ch. Rehmat Ali

84. What was the cause of Quaid-i-Azam Muhammad Ali Jinnah's death?
(A) Diabetes (B) Cancer
(C) Tuberculosis✓ (D) Heart attack

85. Pakistan's first constitution was adopted in:
(A) 1973 **(B) 1956✓**
(C) 1962 (D) 1952

86. The Lahore Resolution was passed in:
(A) 1945 (B) 1938
(C) 1940✓ (D) 1935

87. Which name is associated with Khilafat Movement?
(A) Ch. Rahmet Ali
(B) Allama Muhammad Iqbal
(C) Maulana Muhammad Ali Jauhar✓
(D) Quaid-i-Azam Muhammad Ali Jinnah

88. Quaid-i-Azam Mohammad Ali Jinnah started his Law practice in:
(A) Bombay✓ (B) Karachi
(C) Calcutta (D) Delhi

89. The head of the Boundary Commission for demarcation of borders between India and Pakistan was:
(A) Lord Wavell
(B) Lord Mountbatten
(C) Sir Cyril Radcliffe✓
(D) Sir Stafford Cripps

90. 'K' in Pakistan stands for:
(A) Karakuram (B) Khyber
(C) Kashmir✓ (D) Karachi

91. Pakistan became a member of the United Nations in:
(A) Jan. 1948 **(B) Sept. 1947✓**
(C) Dec. 1947 (D) Aug. 1947

92. All India Muslim League came into being in:
(A) 3 Nov.1930
(B) 29 Dec. 1906
(C) Aug. 1947
(D) 30 Dec. 1906✓

93. Lahore Resolution was passed on:
(A) 23 March 1940✓ (B) 14 Aug. 1947
(C) 14 Aug. 1947 (D) 20 March 1940

94. Objectives Resolution was passed on:
(A) Sept. 1947 (B) 14 Aug. 1947
(C) 12 March 1949✓ (D) 23 March 1940

95. Nehru Report was presented by:
(A) Patel
(B) Motilal Nehru✓
(C) Jawaharlal Nehru
(D) Gandhi

96. Separate Electorate was granted to the Muslims by the British under the:
(A) Act of 1861 (B) Act of 1919
(C) Act of 1935 **(D) Act of 1909✓**

97. The first session of All India Muslim League was held at:
(A) Lahore (B) Aligarh
(C) Karachi✓ (D) Dacca

98. The Quaid-i-Azam became ______ of Pakistan.
(A) President
(B) Chief Minister
(C) Governor-General✓
(D) None of those

99. ______ was the founder of Two Nations Theory.
(A) Ch. Rehmat Ali
(B) Allama Iqbal
(C) The Quaid-i-Azam

(D) Sir Syed Ahmed Khan✓

100. Who was known as 'Ambassador of Hindu-Muslim Unity'?
(A) The Quaid-i-Azam✓
(B) Motilal Nehru
(C) Lord Mountbatten
(D) Gandhi

101. Who was Cyril Radcliffe?
(A) Judge (B) Professor
(C) Lawyer✓ (D) Doctor

102. State Bank of Pakistan came into operation on:
(D) Aug. 1947 (B) July 1948✓
(C) Dec. 1948 (A) Jan. 1949

103. Who was appointed as Pakistan's first woman ambassador?
(A) Ra'ana Liaquat Ali Khan✓
(B) Begum Jahan Ara Shahnawaz
(C) Mohtarma Fatima Jinnah
(D) Begum Shaista Ikramullah

104. Who was the Prime Minister when Pakistan's first Constitution was framed?
(A) Feroz Khan Noon
(B) Ch. Muhammad Ali✓
(C) Khawaja Nazimuddin
(D) M. Ali Bogra

105. Sir Syed founded the Muhammadan Educational Conference in:
(A) 1889 (B) 1881
(C) 1886✓ (D) 1880

106. Partition of Bengal took place in 1905 under the supervision of:
(A) Lord Canning
(B) Lord Mountbatten
(C) Lord Curzon✓
(D) Lord Mayo

107. Before Mountbatten, who was the Viceroy?
(A) Wavell✓ (B) Canning
(C) Mayo (D) Curzon

108. The Montagu-Chelmsford Reforms were in:
(A) 1924 (B) 1919✓
(C) 1913 (D) 1911

109. The Cripps Mission came to India in:
(A) 1946 (B) 1942✓
(C) 1944 (D) 1940

110. What was the role of the Quaid-i-Azam for enacting the Rowlett Act?
(A) None of the above
(B) Opposed it✓
(C) Proposed it
(D) Supported it

111. Who was the ruler of Kashmir in 1947?
(A) Ghulam Muhammad
(B) Hari Singh✓
(C) Sheikh-Abdullah
(D) Gulab Singh

112. Which of the following Acts gave representation to Indians for the first time in the legislature?
(A) Indian Councils Act 1909
(B) Indian Councils Act 1919
(C) Government of India Act 1935✓
(D) None of the above

113. Quaid-i-Azam wanted three law lords from the United Kingdom as important members to be appointed to the:
(A) Communal Award
(B) Boundary Commission✓
(C) August Offer
(D) None of the above

114. Who was the President of first Constituent Assembly of Pakistan?
(A) Quaid-i-Azam✓
(B) Liqauat Ali Khan
(C) Maulvi Tamiz-ud-din
(D) None of these

115. When Radcliffe Award was announced?
(A) 17t August 1947✓
(B) 18th July 1947
(C) 15th August 1947
(D) 17th June 1947

116. What document was drafted first to give pace to constitution making process?
(A) 1973 Constitution
(B) 1962 Constitution
(C) Objectives Resolution✓
(D) 1956 Constitution

117. When did the Constituent Assembly passed the Objectives Resolution?
(A) 12th March 1949✓
(B) 22th March 1948
(C) 22th May 1949
(D) 22th March 1947

118. When did Mohammad Ali Bogra presented Bogra Formula in the assembly?
(A) October 1953✓ (B) April 1953
(C) September 1953 (D) January 1953

119. Who was Mohammad Ali Bogra?
(A) Governor
(B) Prime Minister✓
(C) President
(D) Speaker

120. What is the other name of Mohammad Ali Bogra Formula?
(A) Constitutional Formula✓
(B) Pakistan Report
(C) Third Report
(D) New Law of Pakistan

121. On which date, first constitution of Pakistan was enforced?
(A) 23rd March 1956✓
(B) 23rd March 1953
(C) 23rd March 1955
(D) 13th March 1952

122. On which date, Pakistan become member of the United Nations?
(A) 20th Sep 1950
(B) 13th Sep 1949
(C) 18th Sep 1948
(D) 30th Sep 1947✓

123. Bengal was divided into two provinces in 1905 by __________.
(A) Sir James Oliver
(B) Viceroy Curzon✓
(C) Lord Linlithgow
(D) Lord Ripon

124. Chairman of the first session of the all India Muslim League was:
(A) Nawab Viqar-ul-Mulk
(B) Sir Agha Khan
(C) Nawab Saleemullah
(D) Sir Adamjee Pirbhai✓

125. After the assassination of Liaqat Ali Khan, who became the Prime Minister of Pakistan?
(A) Khawaja Nazimuddin✓
(B) Ms. Fatima Jinnah
(C) Abdul Rab Nishter
(D) Ghulam Muhammad

126. The All India Muslim League was founded in:
(A) 1910 (B) 1995
(C) 1906✓ (D) 1900

127. The Boundary Commission appointed at the time of independence was headed by:
(A) Lord Radcliffe✓
(B) Lord Wawell
(C) Lord Mountbatten
(D) Stafford Cripss

128. Who became the Governor General of Pakistan after the death of Quaid-e-Azam Muhammad Ali Jinnah?
(A) Mohammad Ali Bogra
(B) Khawaja Nazimuddin✓
(C) Ghulam Mohammad
(D) Liaquat Ali Khan

129. Mohammadan Anglo-Oriental College was founded by:
(A) Ch Rehmat Ali
(B) Muhammad Ali Jauhar
(C) Allama Iqbal
(D) Sir Syed Ahmed Khan✓

130. The first President of Muslim League was:
(A) Maulana Fazal-ul-Haq
(B) Sir Syed Ahmed Khan
(C) Allama Iqbal
(D) Nawab Viqar-ul-Mulk✓

131. Govt. of Pakistan constituted a Committee under the chairmanship of Sardar Abdur Rab Nishtar for selecting National Anthem in December __________.
(A) 1948✓ (B) 1950
(C) 1949 (D) 1947

132. The search for suitable words of National Anthem with the music set by A.G. Chagla finally ended with the approval on 13th August ________.
(A) 1956 **(B) 1954✓**
(C) 1955 (D) 1953

133. Simla Deputation (October 1906) comprised of ________ Muslim leaders.
(A) 50 **(B) 35✓**
(C) 40 (D) 18

134. Maulana Muhammad Ali Jauhar was buried in?
(A) Makkah (B) Lucknow
(C) Jerusalem✓ (D) Delhi

135. The Pakistan Resolution was translated in Urdu by:
(A) Maulvi A.K. Fazal-ul-Haq
(B) Nawabzada Liaqat Ali Khan
(C) Sir Zafrullah Khan
(D) Maulana Zafar Ali Khan✓

136. Which Muslim woman participated in all the three Round Table Conferences?
(A) Banu Begum
(B) Amjadi Begum
(C) Fatima Jinnah
(D) Begum Shah Nawaz✓

137. Which woman was part of the delegation first sent to UNO after the creation of Pakistan?
(A) Fatima Jinnah
(B) Fatima Sughra
(C) Begum Salma Tasadduq
(D) Begum Raana Liaqat Ali Khan✓

138. Who was the ruler of Kashmir at the time of partition?
(A) Ranjeet Singh (B) Gulab Singh
(C) Hari Singh✓ (D) Gureet Singh

139. The 'Day of Deliverance' by All India Muslim League was observed on:
(A) 14th September, 1939
(B) 10th November, 1939
(C) 20th October, 1939
(D) 22nd December, 1939✓

140. In 1946, the mission sent by British Govt. was called:
(A) Boundary Commission
(B) Cripps Mission
(C) Cabinet Mission✓
(D) Simon Commission

141. The most important and famous Urdu newspaper published from Lahore by Maulana Zafar Ali Khan was:
(A) Zamindar✓ (B) Nawa-i-Waqt
(C) Koh-i-Noor (D) Hamdard

142. English newspaper "Comrade" in India was published from:
(A) Calcutta **(B) Delhi✓**
(C) Madras (D) Lucknow

143. On behalf of the Muslim League, Quaid-e-Azam signed the Lucknow Pact. Who signed it on behalf of the Congress?
(A) A.K. Azad
(B) Mahatama Gandhi
(C) A.C. Mujamdar✓
(D) Motilal Nehru

144. Who resigned from the Imperial Legislative Council in sheer protest against the Rowlatt Act?

(A) Mian Shafi (B) Nehru
(C) **Quaid-e-Azam✓** (D) Gandhi

145. **Who was appointed the 1st Secretary of All India Khilafat Committee?**
(A) Nawab Liaqat Ali Khan
(B) **Maulana Shaukat Ali✓**
(C) Seth Jan Muhammad Chottani
(D) Maulana Muhammad Ali Johar

146. **The deputation of Muslim leaders to the Viceroy, Lord Minto II, seeking separate electorate was headed by:**
(A) Maulana Shaukat Ali
(B) **Agha Khan✓**
(C) M.A. Jinnah
(D) Sir Syed Ahmad Khan

147. **Why Muslims observed 'Day of Deliverance'?**
(A) End of non-cooperation movement
(B) **End of Congress Ministries✓**
(C) Return of Simon Commission
(D) None of the above

148. **Name the eminent leader of Pakistan Movement who in 1949 took over as the first Governor of Punjab Muslim League.**
(A) Iftikhar Hussain
(B) Nazim-ud-Din
(C) I.I. Chundrigar
(D) **Abdur Rab Nishtar✓**

149. **Who was the first leader of opposition in the first National Assembly constituted under the 1962 Constitution of Pakistan?**
(A) **Fatima Jinnah✓**
(B) Abdul Wali Khan
(C) Mumtaz Daultana
(D) Sardar Bahadur Khan

150. **The origin of the idea of Pakistan is associated with the name of:**
(A) M.A. Jauhar
(B) **Allama Iqbal✓**
(C) Quaid-e-Azam
(D) Sir Syed Ahmad Khan

151. **According to Cabinet Mission Plan, in which group Punjab and Sindh were included?**
(A) Fourth (B) Third
(C) **Second✓** (D) First

152. **Simla Conference was started on:**
(A) 22nd September, 1946
(B) 24th June, 1946
(C) 22nd September, 1945
(D) **24th June, 1945✓**

153. **The issue which made Sir Syed Ahmad Khan to conclude that Hindus and Muslims could not work together any more was:**
(A) Issue of Muslim University
(B) **Hindi Urdu Controversy✓**
(C) Albert Bill
(D) Congress behavior

154. **When was M.A.O. College established in Aligarh?**
(A) **1877✓** (B) 1862
(C) 1875 (D) 1859

155. **Who prepared Pirpur Report?**
(A) Quaid-e-Azam
(B) Zakir Hussain
(C) Abul Kalam Azad
(D) **Raja Syed Mehdi✓**

156. **During the period of One Unit, first Governor of West Pakistan was:**
(A) **Mushtaq Ahmed Gurmani✓**
(B) Abdul Jabbar Khan
(C) Ameer Muhammad Khan
(D) Akhtar Hussain

157. **Who presented the 'Chenab Formula' to resolve the Kashmir dispute?**
(A) Ghulam Abbas
(B) Sardar Ibrahim Khan
(C) Ali Shah Gillani
(D) **Sardar Abdul Qayyum Khan✓**

158. **Pakistan's Standard Time was suggested by:**
(A) Dr. Munir Ahmed Khan
(B) **Professor Muhammad Anwar✓**
(C) Chaudary Rehmat Ali
(D) Maulana Mazhar-ud-Din

159. **Muhammadan Educational Conference was established by Sir Syed Ahmed Khan in:**
(A) 1898 (B) **1886✓**
(C) 1867 (D) 1863

160. **The Cabinet Mission announced its plan on:**
(A) 16th July 1946 (B) 16th May 1945
(C) 3rd June 1947 (D) **16th May 1946✓**

161. **The National Flag of Pakistan was designed by:**
(A) Abdul Hameed
(B) **Ameer-ud-Din Kidwai✓**
(C) A.K. Chagla
(D) Hafeez Jalandhari

162. **When did the Pakistan Government approve the National Anthem?**
(A) **1954✓** (B) 1948
(C) 1852 (D) 1947

163. **The 3rd June Plan announced partition of the Subcontinent into:**
(A) 5 states (B) 3 states
(C) 4 states (D) **2 states✓**

164. **The oath of Governor General was administered to Quaid-e-Azam by:**
(A) Justice Shah Din
(B) Justice Patel
(C) Justice Munir
(D) **Justice Abdur Rasheed✓**

165. **What was the number of Muslim League Ministers in the Interim Government of 1946?**
(A) **5✓** (B) 3
(C) 4 (D) 2

166. **Who was the Chairman of the Boundary Commission for the Subcontinent in 1947?**
(A) George Radcliffe
(B) William Radcliffe

(C) David Radcliffe
(D) Cyril Radcliffe✓

167. Maulana Muhammad Ali Johar issued Comrade English newspaper from Calcutta on:
(A) 27th January 1912
(B) 14th January 1911✓
(C) 27th January 1911
(D) 27th January 1912

168. Before Referendum, Sylhet was the part of:
(A) Assam✓ (B) Bihar
(C) Chitagong (D) U.P

169. Muslim Students Federation (MSF) was established in 1937 by:
(A) Abdur Rab Nishtar
(B) Raja Sahib of Mehmud Abad✓
(C) Raja Gazanfar Ali
(D) Sir Agha Khan

170. Where Quaid-e-Azam stayed during his last illness in 1948?
(A) Hanna Lake (B) Kohlu
(C) Ziarat✓ (D) Makran

171. After independence, the first industrial unit inaugurated by Quaid-i-Azam was:
(A) Pakistan Jute Mills
(B) Valika Textile Mills✓
(C) Karachi Shipyard and Engineering Works
(D) Adamjee Paper Mills

172. During the Pakistan Movement, Qazi Muhammad Isa rendered great services for the Muslims of:
(A) Balochistan✓ (B) Bengal
(C) KP (D) Sindh

173. Who was the first Defence Minister of Pakistan?
(A) Feroz Khan Noon
(B) Ayub Khoro
(C) Nawab Liaqat Ali Khan✓
(D) General Gracy

174. Which is called the parliament of world?
(A) WTO
(B) General Assembly✓
(C) Security Council
(D) UNO

175. UNO Day is observed on:
(A) 5th October **(B) 24th October✓**
(C) 21st October (D) 15th October

176. The rupee coin was first minted in India during the rule of:
(A) Razia Begum
(B) Sher Shah Suri✓
(C) East India Company
(D) Shahjahan

177. Liaqat Ali Khan joined all India Muslim League as a member in:
(A) 1923✓ (B) 1919
(C) 1921 (D) 1916

178. In the Provincial Elections of 1937, All India Muslim League won largest number of seats in the:
(A) Central Provinces (C P)
(B) Sindh province
(C) Punjab province
(D) United Provinces (UP)✓

179. Identify the Secretary of State for India who led the cabinet mission in 1946.
(A) Sir Anthony McDonald
(B) A. V. Alexander
(C) Lord Pethick Lawrence✓
(D) Sir Stafford Cripps

180. Mohtarma Fatima Jinnah joined All India Muslim League in:
(A) 1940 (B) 1938
(C) 1939✓ (D) 1937

181. Congress launched "Quit India Movement" against the British Government in:
(A) 1944 (B) 1941
(C) 1942✓ (D) 1940

182. In the Interim Government of 1946, the Health Minister was:
(A) Ghazanfar Ali Khan✓
(B) Jag Jivan Ram
(C) Asif Ali
(D) Abdur Rab Nishtar

183. After Sir Agha Khan, the next President of All India Muslim League was:
(A) Nawab Ismail Khan
(B) Maulana Zafar Ali Khan
(C) Raja Mahmoodabad✓
(D) Viqar-ul-Mulk

184. The Hindus had launched "Swadeshi Movement" (to boycott English made goods) in the wake of:
(A) The Urdu Hindi Controversy 1867
(B) Partition of Bengal 1905✓
(C) Jallianwala Bagh Tragedy 1919
(D) All of these

185. The British parliament passed Indian Independence Act on:
(A) 24 July 1947 (B) 14 June 1947
(C) 14 July 1947✓ (D) 3 July 1947

186. The first Muslim Inspector General of Prisons Punjab after Independence in 1947 was:
(A) Lt. Col. B.H. Syed
(B) Lt. Col. H.H. Mehmood✓
(C) Lt. Col. G.K. Khan
(D) None of these

187. After independence, on August 14, 1947, how many jails have been constructed in Punjab so far?
(A) 19 (B) 15
(C) 17 **(D) 13✓**

188. Who was first Inspector General Prison Punjab after independence on 14th August 1947?
(A) Sheikh Ikram Ali
(B) Lt. Col. H.H. Mahmood
(C) Lt. Col. B.H. Syed
(D) Lt. Col. G.K. Khan✓

189. **When first census was conducted in Pakistan?**
(A) 1954 (B) 1952
(C) 1953 **(D) 1951✓**

190. **The Muslim demand for Separate Electorate presented by the Simla Deputation 1906 was incorporated in the:**
(A) Quaid's Fourteen Points
(B) Montague-Chelmsford Reforms
(C) Simon Commission Report
(D) Minto Morley Reforms✓

191. **Mopla Revolt took place in the year:**
(A) 1925 **(B) 1921✓**
(C) 1923 (D) 1919

192. **The Round Table Conferences (1930-32) were convened by the British Prime Minister:**
(A) Neville Chamberlain
(B) James Ramsay McDonald✓
(C) Sir Winston Churchill
(D) Clement R. Attlee

193. **During the Congress Rule 1937-39, Vidya Mandar Educational Scheme was prepared by:**
(A) Bankim Chatterjee
(B) Abu-al-Kalam Azad
(C) Dr. Zakir Hussain✓
(D) M.K. Ghandi

194. **Which radio station already existed at the time of creation of Pakistan?**
(A) Peshawar **(B) Lahore✓**
(C) Quetta (D) Multan

195. **The British Cabinet Mission visited India in ________.**
(A) 1947 **(B) 1946✓**
(C) 1944 (D) 1945

196. **Who founded the Indian National Congress?**
(A) Mahatma Gandhi
(B) Dadabhoy Naorojee
(C) Bal Gangadhar Tilak
(D) A.O. Hume✓

197. **After independence the first Governor of Punjab province was ________**
(A) Sir John Lawrence
(B) Mumtaz Ahmad Khan Daultana
(C) Nawab Mamdot
(D) Sir Francis Moody✓

198. **Quaid-i-Azam married his cousin ________ before going to London for higher studies in 1892.**
(A) Maryam **(B) Emibai✓**
(C) Nasreen (D) Jameela

199. **Identify the person who took part in all three Round Table Conferences (1930-32)**
(A) Sir Muhammad Zafarullah✓
(B) Sikandar Mirza
(C) Ghulam Muhammad
(D) Chaudhary Muhammad Ali

200. **Identify the Secretary of State for India who led the Cabinet Mission in 1946:**
(A) Sir Anthony Macdonald
(B) A.V. Alexander✓
(C) Lord Pethick Lawrence
(D) Sir Stafford Cripps

201. **Who presided over the Simla Conference in 1945?**
(A) Lord Mountbatten
(B) Lord Wavell✓
(C) Lord Irwin
(D) Lord Minto

202. **First meeting of Constituent Assembly of Pakistan was held on:**
(A) 13th August 1947
(B) 11th August 1947
(C) 12th August 1947
(D) 10th August 1947✓

203. **Who was the last Viceroy?**
(A) Lord Linlithgow
(B) Lord Mountbatten✓
(C) Lord Wavell
(D) Lord Irwin

204. **Who was the first Chief Election Commissioner of Pakistan?**
(D) G.I. Khan
(B) S.A Rehmat
(C) F.M. Khan✓
(A) Justice S.K. Bashir

205. **Where the Pakistan's first radio station was setup?**
(A) Islamabad **(B) Karachi✓**
(C) Multan (D) Lahore

206. **Who conceived the idea of Pakistan?**
(A) H.S. Suharwardy
(B) Chowdhary Rahmat Ali✓
(C) Mohammad Ali Jinnah
(D) Allama Iqbal

207. **The Quit India Movement was started at:**
(A) Wardha on Aug.7, 1942
(B) Bombay on Aug. 8 1942✓
(C) Lahore on July 7, 1942
(D) Delhi on Aug. 15, 1942

208. **When for the rehabilitation of refugees, emergency was declared for the first time in the history of Pakistan?**
(A) September 25, 1948
(B) August 27, 1948✓
(C) July 25, 1948
(D) November 25, 1948

209. **The first Gazette of Pakistan was issued on August 15, 1947:**
(A) For the appointment of Chief Rehabilitation Commissioner
(B) For appointment of Governor-General of Pakistan✓
(C) For appointment of Chief Justice of Pakistan
(D) For announcement of independence of Pakistan

210. **Who was the Pakistan's first Minister of Religious Affairs?**

(A) Kausar Niazi✓
(B) Abdus Sattar
(C) Ijaz-ul-Haq
(D) None of above

211. The Khaksar Tahrik was established by Allama Inayatullah Khan Mashriqi in:
(A) 1933✓ (B) 1930
(C) 1932 (D) 1931

212. Which Viceroy convened the 'Simla Conference' in 1945?
(A) Lord Willington
(B) Lord Wavell✓
(C) Lord Linlithgow
(D) Lord Mountbatten

213. In 1947, two largest Muslim majority provinces, Bengal and ______ were partitioned.
(A) Punjab✓ (B) Sindh
(C) NWFP (D) Assam

214. Which one of the following Governor Generals was impeached by the British Parliament?
(A) William Bentinck
(B) Warren Hastings✓
(C) Lord Canning
(D) Lord Curzon

215. The Muslim demand of Separate Electorate presented by the Simla Deputation 1906 was incorporated in the:
(A) 3rd June Plan
(B) Govt. of India Act
(C) Mountbatten Plan
(D) Minto-Morley Reforms✓

216. Mohammadan Anglo Oriental College was founded by:
(A) Ch. Rehmat Ali
(B) Muhammad Ali Jauhar
(C) Allama Iqbal
(D) Sir Syed Ahmed Khan✓

217. The Government of India Act was passed in:
(A) 1936 (B) 1932
(C) 1935✓ (D) 1930

218. India's partition plan was announced on?
(A) June 3, 1947✓
(B) July 3, 1947
(C) July 18, 1947
(D) August 14, 1947

219. Who was the last Governor General of Pakistan?
(A) Quaid-i-Azam
(B) Ghulam Muhammad
(C) Iskandar Mirza✓
(D) Ayub Khan

220. The Pakistan Resolution was translated in Urdu by:
(A) Maulana Zafar Ali Khan✓
(B) Nawabzada Liaqat Ali Khan
(C) Sir Zafrullah Khan
(D) Maulvi A.K. Fazl-ul-Haq

221. Radcliffe was by profession:
(A) A doctor (B) An engineer
(C) A lawyer✓ (D) A dentist

222. "Jinnah of Pakistan", a famous book was written by:
(A) Ishtiaq Hussain Qureshi
(B) Stanley A. Wolpert✓
(C) K.B. Sayyed
(D) K.K. Aziz

223. "Day of Deliverance" was observed on:
(A) 23rd March 1940
(B) 14th August 1947
(C) 15th August 1940
(D) 22nd December 1939✓

224. Sir Sikandar Hayat became Chief Minister of the Punjab in:
(A) 1937✓ (B) 1929
(C) 1946 (D) 1935

225. Before Referendum, Sylhet was the part of:
(A) Assam✓ (B) Bihar
(C) Chittagong (D) U.P

226. Name the first book of Allama Iqbal in Urdu.
(A) Ilm-ul-Iqtissad✓
(B) Bang-e-Dara
(C) Javed Name
(D) Bal-e-Jibril

227. Which Pakistani Prime Minister visited China first?
(A) Liaqat Ali Khan
(B) Hussain Shaheed Suharwardi✓
(C) Khawaja Nazimuddin
(D) Muhammad Ali Bogra

228. Pakistan recognized China in which year?
(A) 1948 (B) 1949
(C) 1950✓ (D) 1951

229. When the Muslim League joined the interim government in 1946, Liaqat Ali Khan was assigned the portfolio of:
(A) Foreign Affairs (B) Home
(C) Finance✓ (D) Defence

230. Who was the Chairman of Boundary Commission to define the boundaries of the dominions under the Indian Independence Act of 1947?
(A) Lord Wavell
(B) Stafford Cripps
(C) Lord Mountbatten✓
(D) Cyril Radcliffe

231. Sylhet District at the time of partition was part of the province of:
(A) Bengal
(B) Assam✓
(C) Bihar
(D) United Provinces

232. The first Chief Minister of Punjab after creation of Pakistan was:
(A) Sir Sikandar Hayat Khan
(B) Nawab Iftikhar Hussain Mamdot✓
(C) Mian Mumtaz Khan Daultana
(D) Nawab Sir Khizar Hayat Tiwana

233. The tune of the national anthem of Pakistan

was composed by:
(A) Khawaja Khurshid Anwar
(B) Naushad Ali
(C) Sohail Rana
(D) Ahmad G. Ghagla✓

234. In the elections of 1945-46 out of total Muslim seats of 119, how many seats Bengal Muslim League won?
(A) 114 (B) 110
(C) 115 **(D) 113✓**

235. Sindh was separated from Bombay in:
(A) 1935✓ (B) 1937
(C) 1938 (D) 1939

236. When was created the Pakistan Fund?
(A) 1947✓ (B) 1948
(C) 1951 (D) 1950

237. What deadline did the British Prime Minister Clement Attlee announce for granting of independence to India on February 20, 1947?
(A) June 1947 (B) August 1947
(C) June 1948✓ (D) August 1948

238. Quaid-i-Azam resigned from the membership of Indian National Congress in______.
(A) 1913 (B) 1917
(C) 1920✓ (D) 1928

239. About whom Quaid-i-Azam had stated that he was his "Chief Lieutenant" and "Right hand"?
(A) Liaqat Ali Khan✓ (B) Ayub Khan
(C) Abdul Rab Nishtar (D) Ch. Muhammad Ali

240. Women joined All India Muslim League in ______
(A) 1906 (B) 1940
(C) 1947 **(D) 1937✓**

241. The author of National Anthem of Pakistan is ________
(A) Ch. Rehmat Ali **(B) Hafeez Jalandhri✓**
(C) Allama Iqbal (D) Quaid-i-Azam

242. First population census in Pakistan was conducted in ________.
(A) 1947 (B) 1949
(C) 1951✓ (D) 1953

243. Pakistan became the 57th member of UNO on ________.
(A) 30 September 1947✓
(B) 30 August 1947
(C) 3 November 1947
(D) 3 December 1947

244. Quaid-i-Azam's favourite game was:
(A) Chess (B) Cricket
(C) Tennis **(D) Billiard✓**

245. Quaid-i-Azam resigned from the Indian National Congress as a protest against:
(A) Nehru Report
(B) Mopla Revolt
(C) Gandhi's Non-Cooperation Movement
(D) Satyagraha Movement✓

246. The name of All India Muslim League was proposed in 1906 by:
(A) Quaid-i-Azam
(B) Nawab Saleem Ullah Khan
(C) Sir Muhammad Shafi✓
(D) None of these

247. On 14 August 1947, the only fully operational Muslim bank in Pakistan's territory was:
(A) National Bank of Pakistan
(B) Habib Bank Ltd
(C) Allied Bank Ltd✓
(D) United Bank Ltd

248. Mention the first female member of parliament in Pakistan.
(A) Aneesa Akhtar (B) Zubaida Jalal
(C) Begum Shaista Ikramullah✓
(D) Begum Ra'na Liaqat Ali

249. When Muslim League demanded for principle of self-rule for India?
(A) 1909 (B) 1914
(C) 1915 **(D) 1913✓**

250. The permanent envoy of Pakistan in the UN is:
(A) Hussain Haqqani
(B) Wajid Shams-ul-Hassan
(C) Abdullah Hussain Haroon✓
(D) Ahmad Aziz

251. Who made the official announcement of the annulment of the partition of Bengal, in 1911?
(A) Sir John Jenkins
(B) Lord Hastings
(C) King George III
(D) King George V✓

252. In which pact did the leaders of the Congress and the Muslim League agree on Constitutional Reforms in India including separate electorate for Muslims?
(A) Bombay Pact (B) Lahore Pact
(C) Lucknow Pact✓ (D) Delhi Pact

253. In 1927, the British Parliament appointed a Commission to report on the working of Dyarchy in Indian provinces. Who was the head of this Commission?
(A) Sir John Simon✓
(B) Sir Stafford Cripps
(C) Lord Chelmsford
(D) Sir George Money

World Current Affairs MCQs –2019-2020

Here you will find latest World current affairs MCQs which are from Current International Issues, Geography, Atmosphere, Science & Literature, International Organizations and events. Latest and updated MCQs of Current Affairs of the world.

1. **When US assassinated Iranian General Qassem Soleimani?**
   A. **Jan. 3, 2020✓** B. Jan. 5, 2020
   C. Jan 7, 2020 D. Jan. 9, 2020
2. **Iranian General Qassem Soleimani was assassinated in:**
   A. Tehran B. Isphahan
   C. Mosul D. **Baghdad✓**
3. **On Jan, 10, 2020, sultan Qaboos bin Said of _____ died.**
   A. Jordan B. Kuwait
   C. **Oman✓** D. Yemen
4. **When US and Taliban clinched historic deal for Afghan deal?**
   A. Jan. 2020 B. **Feb 2020✓**
   C. March 2020 D. April 2020
5. **When WHO declared Europe a new epicentre of coronavirus?**
   A. Jan 2020 B. Feb. 2020
   C. **March 2020✓** D. April 2020
6. **Corona Viruses were discovered in the:**
   A. 1950s B. **1960s✓**
   C. 1970s D. 1980s
7. **Novel Coronavirus, a pneumonia outbreak was firstly reported in:**
   A. **China✓** B. Hong Kong
   C. Taiwan D. Singapore
8. **According to a new UN report, which continent could see 300,000 COVID-19 deaths this year?**
   (A) Asia (B) North America
   (C) **Africa✓** (D) Europe
9. **When is World Hemophilia Day observed?**
   (A) April 16th (B) **April 17th✓**
   (C) April 18th (D) April 19th
10. **South Korea's ruling party has won by a landslide in the parliamentary election held in Apr 2020, winning_____of the 300 seats of the National Assembly.**
    (A) 160 (B) 165
    (C) 175 (D) **180✓**
11. **The South Korean general election, in which the electoral reforms gave 18 year olds the vote for the first time, were held on_____.**
    (A) Apr 13, 2020 (B) Apr 14, 2020
    (C) **Apr 15, 2020✓** (D) Apr 16, 2020
12. **Pakistani-American doctor and a state senator for Connecticut who helped develop a ventilator device that makes it possible to treat seven COVID-19 patients at once is:**
    (A) Dr Imtiaz Hussain
    (B) **Dr Saud Anwar✓**
    (C) Dr Ejaz Khan
    (D) Dr Shahid Anwar
13. **Ocean researchers have found the world's "longest animal ever, 150ft long" in deep sea canyon off Australian coast. The name of the animal is_____.**
    (A) Siderophore
    (B) **Siphonophore✓**
    (C) Sirhonophore
    (D) Physlia
14. **Who has been named as The Leading Cricketer in the 2020 edition of Wisden's Cricketers' Almanack?**
    (A) Babar Azam
    (B) Eoin Morgan
    (C) Virat Kohli
    (D) **Ben Stokes✓**
15. **Which country banned the use of saliva, sweat to shine Cricket ball under COVID-19 guidelines?**
    (A) **Australia✓** (B) India
    (C) England (D) Pakistan
16. **The virtual Summit of the Non Aligned Movement (NAM) on COVID-19 pandemic has been organised at the initiative of which country?**
    (A) Kazakhstan (B) **Azerbaijan✓**
    (C) Uzbekistan (D) None of above
17. **Who is the Current Ambassador of the European Union to Pakistan?**
    (A) Jean-Micheal Dumond
    (B) **Androulla Kaminara✓**
    (C) Jean-Francois Cautain
    (D) Gerhard Sabathil
18. **Jack Dorsey, Twitter co-founder pledged $1 billion for coronavirus relief, which makes approximately_____% of his wealth.**
    (A) 25% (B) **28%✓**
    (C) 30% (D) 38%
19. **Bernie Sanders suspended his presidential campaign, clearing the way for Joe Biden to become the Democratic Party's nominee on?**
    (A) Apr 7, 2020 (B) **Apr 8, 2020✓**
    (C) Apr 9, 2020 (D) Apr 10, 2020
20. **Leonardo Dicaprio, the Hollywood star recently launched a coronavirus fund by the name of_____.**
    (A) America's Health Relief

(B) America's Food Relief
(C) America's Health Fund
(D) **America's Food Fund✓**

21. **China to host 3rd Asian Youth Games in Shantou from______.**
(A) Nov 10, 2021 (B) Nov 15, 2021
(C) **Nov 20, 2021✓** (D) Nov 22, 2021

22. **"The Cockroach," a satirical new Brexit novella, is authored by______.**
(A) Leo McEwan (B) Iriel McEwan
(C) **Ian McEwan✓** (D) Lee McEwan

23. **Which two countries have been banned from participating in Tokyo Olympics in weightlifting competition by IWF on disciplinary grounds?**
(A) Indonesia and Malaysia
(B) **Malaysia and Thailand✓**
(C) Indonesia and Thailand
(D) Thailand and Russia

24. **The official name of the virus causing the COVID-19 given by WHO is______.**
(A) SARS-CoV 1 (B) MERS -CoV 1
(C) **SARS-CoV 2✓** (D) MERS-CoV 2

25. **Which country became the first to suspend the use of the video-conferencing tool Zoom by teachers on Apr 11, 2020?**
(A) Sri Lanka (B) **Singapore✓**
(C) Malaysia (D) China

26. **Recently, Opec + agreed to cut oil output by a record amount, representing around 10% of the global supply. As per the agreement the daily production will cut by______.**
(A) 9.5 million B/D (B) 9.6 million B/D
(C) **9.7 million B/D✓** (D) 9.8 million B/D

27. **Which company on 7 April 2020 introduced new policy that limits on message forwarding as part of an effort to curb the spread of misinformation about the corona virus pandemic?**
(A) Facebook (B) Instagram
(C) **WhatsApp✓** (D) Twitter

28. **India announced new Kashmir Domicile Law on ______.**
(A) 1st January 2020
(B) 1st February 2020
(C) 1st March 2020
(D) **1st April 2020✓**

29. **In Wuhan (China), Lockdown was lifted after how many days ?**
(A) 66 days (B) **76 days✓**
(C) 80 days (D) 82 days

30. **Prince Harry and Meghan Markle are planning to launch a charitable organisation named Archewell, the name Archewell is inspired from a Greek word meaning_____.**
(A) Source of Nation (B) Source of Light
(C) **Source of Action✓**
(D) Source of Passion

31. **In 2022, which city will become the first-ever city that has held both the summer and the winter Olympic Games.**
(A) Tokyo (B) **Beijing✓**
(C) Pyeongchang (D) Paris

32. **The 2020 Davis Cup will be the_____edition of the Davis Cup, a tournament between national teams in men's tennis.**
(A) 106th (B) **109th✓**
(C) 100th (D) 103rd

33. **From which country the first case of a Tiger tested positive of COVID-19 has been reported?**
(A) UK (B) **USA✓**
(C) UAE (D) India

34. **The 3rd Asian Youth Games 2021 will be held in ______.**
(A) Singapore (B) **China✓**
(C) Taiwan (D) Hong Kong

35. **Which of following became first city in China to ban the consumption of dog and cat meat?**
(A) Wuhan (B) **Shenzhen✓**
(C) Guangzhou (D) None of these

36. **Mahmoud Jibril has died of Coronavirus after spending two weeks in an Egyptian hospital, he was Former Prime Minister of which of the following country?**
(A) Iraq (B) **Libya✓**
(C) Turkey (D) Egypt

37. **Who was selected as leader of Labour party in UK in April 2020?**
(A) Sadiq Khan (B) **Keir Starmer✓**
(C) Angela Rayner (D) Johnson Slate

38. **The speed of hypersonic missile is _____ the speed of sound which is launched by US Navy?**
(A) 20 times (B) 15 times
(C) 10 times (D) **5 times✓**

39. **Who is Current Secretary General of South Asian Association for Regional Cooperation (SAARC)?**
(A) Arjun Bahadur Thapa
(B) Amjad Hussain Sial
(C) **Esala Weerakoon✓**
(D) None of these

40. **Tony Lewis, famous for Duckworth-Lewis-Stern method passed away, Duckworth-Lewis-stern method is associated with:**
(A) **Cricket✓** (B) Football
(C) Hockey (D) Golf

41. **NASA has selected a new mission named as _____ to study Gaint Solar Particle Storms.**
(A) Sundeep (B) Sunfire
(C) **SunRise✓** (D) Poineer

42. **Which member State assumed Presidency of United Nations Security Council in April 2020?**
(A) Germany (B) Portugal

(C) Poland (D) Dominican Republic✓

43. Recently, which country's princess Maria Teresa became the first to die from COVID-19?
(A) Germany (B) Spain✓
(C) Italy (D) UK

44. Which country recommended all the world countries to use Tan Re Qing to treat COVID-19?
(A) CHINA✓ (B) CUBA
(C) RUSSIA (D) USA

45. Which of the following country has cancelled its multilateral air exercise "Exercise Red Flag"?
(A) UAE (B) UK
(C) FRANCE (D) USA✓

46. Abbott Laboratories has unveiled a coronavirus test which will tell if someone is infected within 5 minutes. The lab is in which country?
(A) USA✓ (B) Australia
(C) Japan (D) Russia

47. _____ scientist in US developed coronavirus testing device, which can give positive results in 5 minutes & negative results in 13 minutes?
(A) Indian (B) Pakistani✓
(C) British (D) Japanese

48. Name the country which has joined as the 30th member of North Atlantic Treaty Organization (NATO) on 27 March 2020?
(A) North-Macedonia✓
(B) Kosova
(C) Bosnia (D) Russia

49. How many countries are the members of NATO?
(A) 30✓ (B) 29
(C) 28 (D) 27

50. Which country's Finance Minster committed suicide because of "deeply worried" over how to cope with the economic fallout from the COVID-19?
(A) Spain (B) Italy
(C) Denmark (D) Germany✓

51. United Nations (UN) estimated international tourism to drop 3% due to virus resulting a loss up to_____ globally.
(A) $50 Billion (B) $100 Billion
(C) $150 Billion (D) $200 Billion

52. Who is the current Prime Minister of Itlay?
(A) Giuseppe-Conto✓
(B) Nicola-Sturgeon
(C) Pedro-Sanchez
(D) None of these

53. The 26th Commonwealth heads of government meeting (CHOGM) 2020 will be held in _____.
(A) England (B) Scotland
(C) Rwanda ✓ (D) Samoa

54. The 2019 Wimbledon championships singles (Women) title was won by_____.
(A) Petra Kvitrova (B) Maria Sharapova
(C) Simona Halep✓ (D) Caroline Wozniacki

55. Which of the following country's Prime Minister has tested positive for coronavirus on 27th March, 2020?
(A) Canada (B) UK✓
(C) Portugal (D) Spain

56. 'Spartly Island' in the South China Sea are disputed between China and_____.
(A) Vietnam (B) Malaysia
(C) Philippines (D) All of these✓

57. When was the first virtual G20 summit held?
(A) 25th March 2020
(B) 26th March 2020✓
(C) 27th March 2020
(D) None of these

58. Khaleda Zia was released from jail on Mar 25, 2020, She was former Prime minister of:
(A) Malaysia (B) Indonesia
(C) Bangladesh✓ (D) Morocco

59. Recently Huntington disease is in news, which of the following body part gets affected by Huntington disease?
(A) Brain✓ (B) Lungs
(C) Heart (D) Skin

60. Who ranked at 1st position in the heritage foundation index 2020 of economic freedom?
(A) Hong Kong (B) Italy
(C) Singapore✓ (D) Indonesia

61. The Tokyo 2020 Olympics have been postponed to _____ due to coronavirus pandemic.
(A) 2021✓ (B) 2022
(C) 2023 (D) None of these

62. How is HPS (Hantavirus Pulmonary Syndrome) treated?
(A) With antibiotics
(B) With oxygen therapy✓
(C) With chemotherapy
(D) None of the above

63. How is the Hantavirus transmitted?
(A) When a mouse or rat bites you
(B) When you inhale airborne particles that contain the hantavirus
(C) When you eat food contaminated with the hantavirus
(D) All of the above✓

64. Jazz legend Manu Dibango died of coronavirus on _____ in Paris.
(A) 24 January 2020
(B) 24 February 2020
(C) 24 March 2020✓
(D) 2 April 2020

65. What group(s) of people has/have a higher risk of developing severe disease and death due to Coronavirus (Covid-19)?
I. Women and Children

II. 60 years old or above
III. people already underlying medical conditions ;
(A) I only (B) II only
(C) I and II (D) II and III✓

66. What is the rank of Pakistan in World Happiness Report 2020?
(A) 68/156 (B) 68/156
(C) 66/156✓ (D) 144/156

67. The oldest fossil of a modern bird has been discovered and has named as______.
(A) Lesula (B) Epimeria
(C) Kipunji (D) Wonderchiken✓

68. According to the World Happiness Report 2020, which is the happiest country in the world?
(A) Denmark (B) Finland✓
(C) Singapore (D) USA

69. Which decade is announced as international decade for people of African Descent?
(A) 2015-2024✓ (B) 2017-2026
(C) 2020-2029 (D) None of these

70. Which country has successful conducted a test-flight of a Hypersonic Missile after Russia?
(A) USA✓ (B) North Korea
(C) France (D) Israel

71. Who was nominated as Prime Minister of Iraq by President Barham Salih on 17 March 2020?
(A) Mohammed Tawfiq Allawi
(B) Adnan al- Zurfi✓
(C) Adel Abdul Mahdi
(D) None of them

72. Which of the following disease(s) is/ are related to Coronavirus?
(A) SARS (B) MERS
(C) Both A and B✓ (D) None of above

73. The first ever prisoner exchange talks between Afghan government and Taliban held on:
(A) 20 March 2020 (B) 21 March 2020
(C) 22 March 2020✓ (D) 23 March 2020

74. Video conference of SAARC leaders on COVID-19 held on which date?
(A) 14 March 2020 (B) 15 March 2020✓
(C) 16 March 2020 (D) None of these

75. Who is the incumbent President of FIFA?
(A) Gianni Infantino✓
(B) Michael Garcia
(C) Jerome Champagne
(D) Robbert Whem

76. What is the name of Pak-Bahrain joint exercise held in national counterterrorism center Pabbi?
(A) Al-Saif IV
(B) Al-Asr III
(C) Al-Badar IV✓
(D) None of these

77. Who is the Current Prime Minister of New Zealand?
(A) Jacinda Ardern✓
(B) Simon Bridges
(C) Sophie Wilms
(D) None of these

78. In March 2020, Turkish prosecutors charged _____ suspects over the brutal murder of Jamal Khashoggi?
(A) 10✓ (B) 20
(C) 15 (D) 5

79. The International Monetary Fund (IMF) announced aid package to help fight the Coronavirus of:
(A) $35 billion (B) $43 billion
(C) $50 billion✓ (D) $54 billion

80. The First Cricket Match of One Day International series played in front of no crowd was between?
(A) Australia vs New Zealand✓
(B) New Zealand vs England
(C) India vs New Zealand
(D) Pakistan vs Sri Lanka

81. Which global organisation has launched the "COVID Action Platform" to convene the business community to support for COVID-19?
(A) World Bank
(B) World Economic Forum✓
(C) International Monitory Fund
(D) United Nations

82. In March 2020, the World Health Organization (WHO) decleared Covid-19 as a_____.
(A) Pandemic✓
(B) Endemic
(C) Epidemic
(D) Zoonotic

83. According to the report published by Stockholm International Peace and Research Institute (SIPRI) on 9 March 2020, which country is the 11th largest arms importer in the world?
(A) India (B) Afghanistan
(C) Bangladesh (D) Pakistan✓

84. Who is the Current Prime Minister of Denmark?
(A) Helle Thorning-Schmidt
(B) Inger Støjberg
(C) Mette Frederiksen✓
(D) None of these

85. Who is the current Prime Minister of Belgium?
(A) Kolinda Graber-Kitarovic
(B) Katrin Jakobsdottir
(C) Sophie Wilmes✓
(D) None of these

86. Which country witnessed the swearing in of two Presidents on March 10, 2020?
(A) Nepal
(B) Afghanistan✓

(C) Malaysia
(D) Sri Lanka

87. Which country hosted the 56th Munich Security Conference(MSC) 2020?
(A) Austria
(B) France
(C) Germany✓
(D) Spain

88. What is the name of NASA's rover for Mars Mission 2020?
(A) Prospect
(B) Call
(C) Innovation
(D) Perseverance✓

89. The World Bank has announced how much aid package to help countries combat Coronavirus outbreak?
(A) USD 10 billion
(B) USD 12 billion✓
(C) USD 14 billion
(D) USD 16 billion

90. Bangladesh is going to celebrate the "Mujib Borsho' in which year?
(A) 2021
(B) 2020✓
(C) 2019
(D) 2022

91. Recently which of the following African country has been listed in FATF's Grey list?
(A) Mauritius✓
(B) Kenya
(C) Zimbabwe
(D) Ethiopia

92. Which Country has won the ICC Women's T20 World Cup 2020?
(A) India
(B) Australia✓
(C) England
(D) South Africa

93. Which country has won the ICC Women's T20 World Cup maximum times?
(A) West Indies
(B) England
(C) Australia✓
(D) New Zealand

94. How many teams participated in the Women's World Cup T20, 2020?
(A) 7
(B) 8
(C) 9
(D) 10✓

95. How many times Australian women's cricket team won the T20 World Cup title out of 7 tournaments held from 2009 to 2020?
(A) 1
(B) 3
(C) 5✓
(D) 7

96. Women's T20 World Cup 2020 was the _____ World Cup held by ICC.
(A) 5th (B) 6th
(C) 7th✓ (D) 8th

97. Name the First Muslim Hijab woman elected as Member of Israel Parliament in March 2020 elections?
(A) Hanadi Saleh
(B) Iman Khatib-Yasin✓
(C) Sarah Jabara
(D) Nayla Haya

98. In which year, the Taliban office was opened in Qatar?
(A) 2003 (B) 2010
(C) 2013✓ (D) 2020

99. According to the "Hurun Global Rich list 2020" which country has the highest number of billionaires?
(A) USA (B) Saudi Arabia
(C) China✓ (D) Russia

100. After how many years' the United States & Taliban signed historic peace agreement in Doha, Qatar?
(A) 16 (B) 18✓
(C) 20 (D) None of these

101. Muhyiddin Yassin was sworn in as the _____ PM of Malaysia.
(A) 6th (B) 8th✓
(C) 10th (D) None of these

102. Janez Jansa has been appointed as a new Prime Minister of which country?
(A) Nepal (B) Ghana
(C) Slovenia ✓ (D) Madagascar

103. Which country has recently withdrawn from UNHCR?
(A) Argentina (B) Maldives
(C) Bahamas (D) Sri Lanka✓

104. The Diamond Princess cruise ship, which witnessed the largest coronavirus outbreak, is quarantined in which country?
(A) China (B) South Korea
(C) Japan✓ (D) Iran

105. Who becomes the first country with free public transport?
(A) America (B) Japan
(C) Finland (D) Luxembourg✓

106. Where Afghan-Peace-Deal was signed?
(A) Kabul
(B) New York
(C) Doha✓
(D) Islamabad

107. Who signed the Afghan-Peace-Deal on the behalf of USA?
(A) Donald Trump
(B) Zalmy Khalilzad✓
(C) Mike Pompeo
(D) James Mattis

108. Afghan Peace Deal was signed between?
(A) Afghanistan Govt. & USA
(B) Al-Qaeda & USA
(C) Taliban & USA✓
(D) Afghanistan Govt. & NATO

109. Who signed the peace accord on behalf of the Islamic Emirate of Afghanistan?
(A) Hibatullah Akhundzada
(B) Akhtar Mohammad Mansour
(C) **Mullah Abdul Ghani Baradar✓**
(D) Mullah Naseer Ahmad

110. On which date, Afghan Peace Deal was signed?
(A) 14 Feb. 2020
(B) 20 Feb. 2020
(C) **29 Feb. 2020✓**
(D) 3 March 2020

111. Which country is the first to develop an antibody test to identify the novel coronavirus (COVID-19)?
(A) China
(B) USA
(C) **Singapore✓**
(D) Japan

112. Who became the first woman in Saudi Arabia to head the Saudi Arabia's Music Commission?
(A) **Jihad Al-Khalidi✓**
(B) Reema Bint Bandar
(C) Sadia Bint Khalid
(D) None of these

113. Former President of Egypt Muhammad Hosni Mubarak served as the_____ president of Egypt from 1981 to 2011.
(A) Third
(B) **fourth✓**
(C) fifth
(D) None of these

114. Former Egyptian President Hosni Mubarak died on 25 February 2020 at the age of_____.
(A) **91✓** (B) 90
(C) 89 (D) 93

115. AIBA_Boxing World Cup 2020 to be held in_____.
(A) **Russia ✓** (B) UK
(C) USA (D) Bolivia

116. When did Malaysian Prime Minister Mahathir Mohamad send resignation from Premiership and asked the Malaysian King to form a new Government ?
(A) 19 February 2020
(B) 21 February 2020
(C) 23 February 2020
(D) **24 February 2020✓**

117. What is the name of the United State's first lady?
(A) **Melania Trump✓**
(B) Martha Trump
(C) Michelle Trump
(D) Rachel Trump

118. Patricia Scotland is the _____ Commonwealth Secretary-General.
(A) 5^{th} (B) **6th✓**
(C) 7^{th} (D) 8th

119. Darren Sammy a famous cricket player was born in_____.
(A) **Saint Lucia✓**
(B) Jamaica
(C) Saint Vincent
(D) Barbados

120. The Secretary General is nominated by Commonwealth leaders and can serve a maximum of _____ term(s) of 4 years each?
(A) Four
(B) **Two✓**
(C) Three
(D) None

121. Patricia Janet Scotland the current Secretary General of the Common wealth was born in:
(A) **Dominica✓**
(B) Jamaica
(C) Ireland
(D) Ecuador

122. Which city hosted the 3rd Global Ministerial Conference on Road Safety?
(A) Helsinki
(B) **Stockholm✓**
(C) Oslo
(D) Rome

123. What is the name of the storm which hit the United Kingdom in February 2020?
(A) Storm Habin
(B) Storm Kyar
(C) Storm Cirar
(D) **Storm Dennis✓**

124. How many teams participated in Kabaddi 2020 World Cup?
(A) 8 (B) 9
(C) **10✓** (D) 11

125. What is the hottest recorded Temperature in Antarctica?
(A) 16.3°C (B) 17.3°C
(C) **18.3°C✓** (D) 19.3°C

126. UK officially left European Union after _____ years.
(A) 40 (B) **47✓**
(C) 50 (D) 48

127. Becoming the world's first climate-neutral continent by 2050, the European Commission presented the:
(A) European Green Deal
(B) **Green European Deal✓**
(C) Clean European Deal
(D) None of these

128. In Gallup International's annual popularity index of world political leaders, who emerged as the topmost Muslim leader for the year 2020?
(A) PM Pakistan Imran Khan
(B) **Turkish President Recep Tayyip Erdoğan✓**
(C) Iranian President Rouhani
(D) Saudi Prince Muhammad bin Salman

129. The 43rd session of International Fund for Agricultural Development (IFAD) was held in _____ from 11-12 February 2020
(A) Rome, Italy✓
(B) Islamabad, Pakistan
(C) Delhi, India
(D) Paris, France

130. What is the name of the Turkey's first lady?
(A) Emine Erdogan✓
(B) Zehra Erdogan
(C) Esma Erdogan
(D) None of these

131. Bashar Al Asad is the President of which country ?
(A) Jordan
(B) Palestine
(C) Syria✓
(D) Yemen

132. World Health Organization named deadly virus from China as _____.
(A) COVID-19✓
(B) NOVID-19
(C) NCV-19
(D) None of these

133. According to researchers from South China Agricultural University, which animal has been identified as potential link for novel Coronavirus spread?
(A) Pangolin✓ (B) Snake
(C) Bat (D) Rat

134. Which country revealed that it has 'neutralised' 101 Syrian troops on February 11, 2020 ?
(A) Qata (B) UAE
(C) Indonesia (D) Turkey✓

135. Sheikh Khalid bin Khalifa bin Abdulaziz Al Thani appointed as new Prime Minister of _____.
(A) Qatar✓ (B) Iraq
(C) Lebanon (D) Jordan

136. About how many years Sultan Qaboos ruled in Oman?
(A) 20 years (B) 30 years
(C) 40 years (D) 50 years

137. Sultan Qaboos, who died recently, belongs to which country?
(A) Kuwait (B) Oman
(C) Iran (D) Saudi Arabia

138. Which country launches gigantic telescope "Sky Eye" for hunt of life beyond earth?
(A) India (B) China
(C) USA (D) Russia

139. Qaboos bin Said Al Said was the Sultan of Oman. He died on _________ ?
(A) 09 January 2020
(B) 10 January 2020
(C) 11 January 2020
(D) 12 January 2020

140. Who sworn in as new Sultan of Oman?
(A) Quboos said al said
(B) Saad bin saad
(C) Salman bin al saud
(D) Haitham bin Tariq Al Said

141. What was the age of Sultan 'Qaboos bin Said Al Said' of Oman who died on Jan 10, 2020?
(A) 69 (B) 79
(C) 80 (D) 81

142. Who is the supreme leader of Iran?
(A) Zarif Javed
(B) Qasem soleimani
(C) Ayatollah Ali Khamenei
(D) Hisbollah

143. Which Country has developed a Laser-based Aerial defense system?
(A) Iran (B) North Korea
(C) Israél (D) Turkey

144. The Commonwealth Games 2022 will be held between __________ ?
(A) 25 June to 25 July 2022
(B) 27 July to 7 August 2022
(C) 29 September to 28 October 2022
(D) 20 November to 19 December 2022

145. The Commonwealth Games 2022 will be held in Birmingham. It is the ________ time when England will host the event.
(A) 2nd Time (B) 3rd Time
(C) 4th Time (D) None of these

146. Which city will host the 2022 Commonwealth Games __________?
(A) Moscow
(B) Birmingham
(C) Colombo
(D) Jakarta

147. Colombo declaration is related to __________?
(A) Anti- drug Trafficking
(B) Economic Interests
(C) Infrastructure development
(D) Marine security

148. Which nation has recently banned the ' reef toxic' Sunscreen?
(A) New Zealand
(B) Palau
(C) Australia
(D) Nauru

149. World Braille day celebrated every year on____________?
(A) January 2 (B) January 3
(C) January 4 (D) January 5

150. Qassem soleimani who was killed in US air strike was the Iranian Military Commander began his Military career at the start of Iran-Iraq war during the _________?
(A) 1960s (B) 1970s
(C) 1980s (D) 1990s

151. The Iranian Commander General Qassem soleimani laid to rest after Iran attacks US airbases on_________?
(A) 5 january 2020
(B) 6 january 2020

(C) 7 january 2020
(D) **8 january 2020**

152. The Iranian commander General Qassem Soleimani was laid to rest in his hometown of__________?
(A) Shiraz (B) **Kerman**
(C) Tehran (D) Isfahan

153. Daniele De Rossi, who announced his retirement recently, is a world cup winning footballer of which country______?
(A) France (B) Brazil
(C) Itlay (D) Germany

154. The Ukrainian Boeing-737-800 plane crashed at the __________ in Tehran on January 08, 2020?
(A) Parsabad Airport (PFQ)
(B) **Imam Khomeini Airport (IKA)**
(C) Shahid Hashemi Nejad Airport (MHD)
(D) Mehrabad Airport (THR)

155. The Ukrainian Boeing-737-800 plane crashed at the Imam Khomeini Airport in Tehran on ________?
(A) 7th January 2020
(B) **8th January 2020**
(C) 6th January 2020
(D) 5th January 2020

156. Ukrainian Boeing 737-800 crashed in which nation on January 8, 2020, killing all onboard passengers?
(A) **Iran** (B) Iraq
(C) Turkey (D) Afghanistan

157. Which country launched missiles at US troops in Iraq on 7 January 2020?
(A) Turkey (B) U.K
(C) Afghanistan (D) **Iran**

158. __________ became as World's Youngest Chancellor?
(A) **Sebastian Kurz**
(B) Sana mariland
(C) Greta thunberg
(D) Angelena

159. Donald Trump become third President in US history to be impeached by the House of Representives. Who are the other two presidents to be impeached by the House of Representatives?
(A) Ronald Reagon and Bill Clinton
(B) Richard Nixon and Andrew Jackson
(C) **Andrew Johnson and Bill Clinton**
(D) Ronald Reagon and Richard Nixon

160. In some states of which country, CROWN Act has been passed to protect people of colour from being discriminated against for their natural hair.
(A) Australia (B) **USA**
(C) China (D) Germany

161. US space agency NASA is developing 'X-59'. what is this?
(A) A prototype of house to built on Mar
(B) **Space plane faster than speed of sound**
(C) A Lander for landing on the South Pole of the Moon
(D) Spacecraft to explore the interteller world

162. Which animal species has been most adversely impacted by Australia's wildfire?
(A) **Koala** (B) Kangaroo
(C) Mandook (D) Polar Bear

163. Qassim Soleimani ,who was killed in the US airstrike was the Military Commander of which country?
(A) **Iran** (B) Libya
(C) Iraq (D) Syria

164. Who has become the seventh batsman in the world to hit 6 sixes in an over?
(A) **Leo Carter** (B) John Morrison
(C) Berry Headly (D) Geoff Howarth

165. Who is the current President of Guinea Bissau?
(A) Alpha Condé
(B) Ahmed Sékou Touré
(C) Lansana Conté
(D) **Umaro Cissoko**

166. Which country recently elected Umaro Cissoko as its new President in January 2020?
(A) **Guinea Bissau**
(B) Ghana
(C) Indonesia
(D) Nigeria

167. Iranian General Shaheed Qasim Sulemani was Born in________?
(A) 1955 (B) **1957**
(C) 1960 (D) 1962

168. The US aviation regulator has warned American airlines from operating in the airspace of which Country?
(A) **Pakistan** (B) India
(C) China (D) South Korea

169. Who killed Major General Qassim Sulemani in an overnight airstrike at the Baghdad Airport?
(A) UK (B) Russia
(C) **USA** (D) China

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Pakistan Current Affairs MCQs – 2019-2020

Here you will find updated 2019-2020 Current Affairs of Pakistan MCQs.

1. **Approximate number of cancer cases yearly reported in Pakistan is ________.**
A. 1480 B. 14800
C. 15000 D. 148000✓

2. **"Standard & Poor's" (S&P) downgraded Pakistan's credit rating from B to______.**
A. B PLUS B. B NEGATIVE✓
C. C D. C NEGATIVE

3. **Who is the current Ambassador of Pakistan to UK?**
A. Masood Khalid B. Nafees Zakaria✓
C. Ali Jahangir Siddiqui
D. Syed Ibn-e-Abbas

4. **Who is the current Ambassador of Pakistan to Saudi Arabia?**
A. Sajid Bilal B. Masood Khalid
C. Brig Bilal Asad D. Raja Ali Ijaz✓

5. **Who is the current Ambassador of Pakistan to Canada?**
A. Mr. Raza Sher Tarar✓
B. Riaz Mohammad Khan
C. Mr Masood Khalid
D. Salman Bashir

6. **Who became first Asian woman to play 100 T20s?**
A. Sana Mir✓ B. Mithali Raj
C. Bismah Maroof D. Sidra Ameen

7. **Pakistan has been hosting the maritime multinational naval drill 'AMAN' since__________.**
A. 2006 B. 2007✓
C. 2008 D. 2009

8. **What is name of satellite developed by The King Abdul Aziz City for Science and Technology (KACST) and Lockheed Martin Space on 5 Feb 2019?**
A. SGS-1✓ B. SGS-2
C. SJS-1 D. None of these

9. **When Eighteenth Amendment of the Constitution of Pakistan was passed by the National Assembly of Pakistan?**
A. April 8, 2018 B. April 8, 2019
C. April 8, 2010✓ D. April 8, 2011

10. **The Ninth National Finance Commission (NFC) meeting was deadlocked since_________.**
A. July 2015✓ B. July 2016
C. July 2017 D. July 2018

11. **How many families from all over the country will be given Sehat Card by Sehat Sahulat Program (SSP) from Govt. of Pakistan?**
A. 10 million B. 15 million✓
C. 20 million D. 25 million

12. **Which of the following Pakistani company was shortlisted at the GSMA Global Mobile Awards (GLOMO Awards) for the year 2019?**
A. Zong Group B. JS Bank✓
C. Telenor Group D. Habib Bank

13. **Until January 2019, Pakistan Army had completed how much length of fence near Afghanistan boundary?**
A. 700km B. 800km
C. 900km✓ D. 1200km

14. **How many national and international companies have been blacklisted by PPRA in Jan 2019?**
A. 50 B. 45✓
C. 40 D. 35

15. **According to new policy of government of Pakistan on 1st February, 2019, how much price was fixed to perform Hajj?**
A. Rs. 280,000 B. Rs. 360,000
C. Rs. 456,000 ✓ D. Rs. 524,000

16. **Night navigation system for the large vessels was launched at Port _______ for the very first time in the history of Pakistan.**
A. Qasim✓ B. Gwadar
C. Karachi D. Pasni

17. **The Karakoram International Alpine Ski Cup 2019 was held in________.**
A. China B. Pakistan✓
C. Afghanistan D. Nepal

18. **How many countries participated in Karakoram International Alpine Ski Cup 2019?**
A. 11 Countries B. 13 Countries✓
C. 15 Countries D. 17 Countries

19. **Which Pakistani teacher won the coveted World's Dedicated Teacher award announced by Cambridge University?**
A. Ahmed Jabar B. Ahmed Saya✓
C. Saeed Ahmed D. Syed Ahmed Shah

20. **Name the Pakistani Journalist who won the AFP's Kate Webb Prize 2018.**
A. Asad Hashim✓ B. Hamid Mir
C. Javed Chaudhry D. None of the above

21. **First Captain of Pakistan National Women Blind Cricket Team is _________.**
A. Salma Javed B. Nazia Beenish
C. Rabia Shahzadi✓
D. Firdus Malik

22. **On 31-January-2019, federal cabinet approved what percent increase in Hajj cost?**
A. 61 percent B. 62 percent
C. 63 percent✓ D. 64 percent

23. **Pakistan Govt started the first-ever "Islamabad Deworming Initiative" on ________ which will deworm 250,000 children.**
A. 30 Jan 2019✓ B. 29 Jan 2019
C. 28 Jan 2019 D. None of them

24. **Who is the current Ambassador/ Permanent Representative of Pakistan to World Trade Organization (WTO)?**
A. Muhammad Mohsin Rafiq
B. Shahid Bashir✓
C. Dr. Syed Tauqir Shah
D. Muhammad Pervaiz Malik

25. **Corruption Perception Index 2018 released by the Transparency International on 29 January, 2019 ranked Pakistan __________ out of 180 countries.**
A. 110 B. 112
C. 116 **D. 117✓**

26. **Corruption Perceptions Index 2018 released by the Transparency International on 29 January, 2019 scored Pakistan ________ out of 100.**
A. 33✓ B. 34
C. 35 D. 36

27. **The first-ever Cardiac Hospital in Gilgit Baltistan was inaugurated on 30 Jan 2019 by__________.**
A. Chief Minister Gilgit Baltistan✓
B. Governor Gilgit Baltistan
C. Health Minister Gilgit Baltistan
D. None of these

28. **Who was appointed as Pakistan's first Hindu Civil Judge?**
A. Seema Bedi
B. Krishna Kumari
C. Suman Bodani✓
D. None of these

29. **Which of the following political party of Pakistan on 28 Jan, 2019 submitted in the National Assembly a constitutional amendment bill for the creation of the Bahawalpur and South Punjab Provinces?**
A. PPP B. PTI
C. PML-N✓ D. PML-Q

30. **What is the name of dollar-denominated diaspora bond which was set by Pakistani Government on 31 January 2019 for overseas Pakistanis to increase foreign exchange reserves?**
A. Pakistan Banao Certificate✓
B. Qarz Utaro Certificate
C. Khoshhal Pakistan Certificate
D. Pakistan Overseas Certificate

31. **In which country, Pakistani renowned actress Roohi Bano passed away?**
A. Egypt B. UAE
C. Turkey✓ D. Iran

32. **When Sahiwal incident was happened in which four people – including two women – were killed in the 'encounter' involving Punjab's Counter Terrorism Department (CTD) personnel on a highway in the Qadirabad area of Sahiwal district?**
A. 11 Jan 2019
B. 15 Jan 2019
C. 19 Jan 2019✓
D. 23 Jan 2019

33. **Pakistan Navy hosted AMAN 19 Excercise with slogan of __________.**
A. Together for peace✓
B. To fight for peace
C. To learn for peace
D. None of these

34. **Pakistan won 19th Asian Junior Squash Tournament's final on _______.**
A. 18 January 2019
B. 20 January 2019✓
C. 19 November 2018
D. None of these

35. **According to "New Visa Policy" Visa on arrival is for 50 countries but previously, nationals of only ______ countries had that option.**
A. 15 B. 20
C. 24✓ D. 32

36. **When Government of Pakistan introduced a "New Visa Policy" to encourage tourism in the country?**
A. 20 December 2018
B. 30 December 2018
C. 10 January 2019
D. 25 January 2019✓

37. **Who became the second fastest player to reach the milestone by scaling the 1000 run mountain in just 19 ODI matches?**
A. Shoaib Malik
B. Fakhar Zaman
C. Imam-ul-Haq✓
D. Babur Azam

38. **Pakistan successfully conducted the training launch of the Nasr – a short-range surface-to-surface ballistic missile on_________.**
A. 12-January-2018 B. 12-January-2019
C. 24-January-2018 **D. 24-January-2019✓**

39. **Which country lifted ban on import of Pakistani Rice?**

A. Kuwait B. Iran
C. Qatar✓ D. Saudi Arabia

40. **When Supreme Court of Pakistan imposed ban on Basant festival?**
A. 2004 B. 2005✓
C. 2007 D. 2009

41. **Which Pakistani politician was named among Foreign Policy Magazine's 2019 list of Global Thinkers?**
A. Asad Umer B. Imran Khan✓
C. Shah Mahmood D. Umer Ayub

42. **When Finance Minister Asad Umar presented the Third Finance Bill 2018-19 (Mini-Budget) in the National Assembly?**
A. 22 January 2019
B. 23 January 2019✓
C. 24 January 2019
D. 25 January 2019

43. **The 10th meeting of the SAARC Food Bank Board was held in________on 21st to 22nd January 2019.**
A. Kathmandu B. New Delhi
C. Islamabad✓ D. Male

44. **Which country doubled the quantum of wheat from 40,000 tonnes to 80,000 tonnes as its share for the 'Regional Food Bank' maintained by the South Asian Association for Regional Cooperation (SAARC)?**
A. India B. Bangladesh
C. Pakistan✓ D. Sri Lanka

45. **The State Bank of Pakistan (SBP) on 22 January signed an agreement with Abu Dhabi Fund for Development (ADFD) for__________to be deposited in the SBP account.**
A. \$3 billion✓ B. \$4 billion
C. \$5 billion D. \$7 billion

46. **Iran-Pakistan Free Economic Zone is going to establish in which city to increase bilateral trade with Pakistan?**
A. Mirjaveh city✓ B. Gwadar
C. Dalbandin D. Tehran

47. **According to Democracy Index 2018 published by The Economist, Pakistan is placed under ______ category.**
A. Full Democracy
B. Flawed Democracy
C. Hybrid Regime✓
D. Authoritarian

48. **Democracy Index 2018 published by The Economist ranked Pakistan _____ out of 167 countries.**
A. 110 B. 112✓
C. 114 D. 116

49. **Who is the current Captain of Pakistan Woman Cricket Team?**
A. Sana Mir B. Javeria Khan
C. Nain Abidi D. Bisma Maroof✓

50. **The Provincial Cabinet of Sindh on January 21, 2019, in a landmark decision approved to replace 100 years old Prison Act 1894 with new act titled:**
A. Sindh Prisons Reform Act 2019
B. Rehabilitation Of Prisons Sindh Act 2019
C. Sindh Prison and Correction Act 2019✓
D. None of these

51. **Which judge of Indian Supreme Court attended the Pakistan Chief Justice Asif Saeed Khosa's Oath Taking Ceremony on 18-January-2019?**
A. Justice Ranjan Gogoi✓
B. Justice Sharad Arvind Bodbe
C. Justice N.V. Ramana
D. Justice Dipak Misra

52. **Asif Saeed Khosa, 26th CJP Supreme Court of Pakistan belongs to:**
A. Balochistan High Court
B. Lahore High Court✓
C. Sindh High Court
D. Peshawar High Court

53. **Which two Asian countries are ranked with 89% of people expressing patriotism towards their homeland?**
A. Pakistan & Vietnam✓
B. Pakistan & Bangladesh
C. Afghanistan & India
D. China & India
E. None of these

54. **PM Imran Khan received 'Golden Kalashinkov' as a gift from ______.**
A. Turkey B. Saudi Arabia✓
C. UAE D. None of these

55. **APS Survivor _________ became third Pakistani to receive Points of Light Award.**
A. Ahmed Ali B. Ahmed Nawaz✓
C. Noman Ahmed D. None of these

56. **APS Survivor Ahmed Nawaz received 'Points Of Light' Award in ________.**
A. U.S.A B. U.A.E
C. U.K✓ D. None of these

57. **Who become first wicket keeper-Captain to take 10 catches in a Test match?**
A. Sarfraz Ahmed✓
B. M.S Dhoni
C. B. Taylor
D. de Kock

58. **According to report of UNICEF, an estimate of how many babies were were born in the world on new year day in 2019?**

A. 395,000✓ B. 398,072
C. 400,500 D. 400,250

59. According to report of UNICEF, an estimate how many babies were born in Pakistan on new year day in 2019?
A. 10,000 B. 15,000✓
C. 20,000 D. 25,000

60. Indus Water Treaty 1960 requires the water commissioners of Pakistan and India to meet ________ a year.
A. Once B. Twice✓
C. Thrice D. None

61. Who is the Commissioner for Indus Water of Pakistan?
A. Mehmood Khan
B. Ali Akbar
C. Syed Muhammad Mehar Ali Shah✓
D. Ameen Khan

62. CPEC has how many Special Economic Zones?
A. 6 B. 8
C. 9✓ D. 5

63. Who is the current Captain of "Pakistan National Football Team"?
A. Javed Hussain
B. Saddam Hussain✓
C. Nazir Hussain
D. Bilal Hussain

64. In Pakistan history, which first Sikh "PRO" to Punjab Governor was appointed?
A. Sardar Jaswant Singh
B. Sardar Mohan Singh
C. Sardar Pawan Singh Arora✓
D. Sardar Jaipal Singh

65. Which of the following is the author of the book "We Are Displaced"?
A. Reham Khan
B. Malala Yousufzai✓
C. Nadia Murad
D. Sharmeen Obaid

66. The under-construction Gulpur Hydropower Project to generate 102 MW of electricity is located in ________.
A. Jhelum B. Kotli✓
C. Mirpur D. Gilgit

67. Multan metro bus project was funded by ________.
A. Punjab Government✓
B. World Bank
C. Asian Development Bank (ADB)
D. International Monitory Fund (IMF)

68. How much ballout package was formalized by Abu Dhabi Crown Prince?
A. 5.2bn USD B. 6.2bn USD✓
C. 7.2bn USD D. 3.2bn USD

69. After how many years, UAE Prince Sheikh Mohammed bin Zayed bin Sultan Al-Nahyan visited Pakistan on Jan 6, 2019?
A. 7 Years B. 9 Years
C. 12 Years✓ D. 14 Years

70. When Abu Dhabi Crown Prince Sheikh Mohammed bin Zayed bin Sultan Al-Nahyan visited Pakistan?
A. 4th January 2019
B. 5th January 2019
C. 6th January 2019✓
D. 7th January 2019

71. Which two legends of Football arrived in Pakistan on 10th January 2019?
A. Kaka and Figo✓
B. Figo and Luka
C. Kaka and Messi
D. Messi and Ronaldo

72. ________ has been titled the "Mountain Princess" by Pakistan's mountaineering community?
A. Samina Baig B. Selena Khawaja✓
C. Uzma Shah D. Momina Saleem

73. Who is current Chief Justice of Pakistan?
A. Justice Anwar Zaheer Jamali
B. Justice Mian Saqib Nisar
C. Justice Asif Saeed Khan Khosa✓
D. Justice Iftikhar Muhammad Chaudhry

74. The current National Assembly is ________ in the country's history.
A. 14th B. 15th✓
C. 16th D. 18th

75. Pakistan's first electronic grave belongs to________.
A. Abdul Sattar Edhi
B. Dr. Ruth Pfau✓
C. John Elia
D. None of these

76. First-ever female ombudsperson appointed in the history of KP is ________.
A. Shafqat Ara
B. Rakhshanda Naz✓
C. Naseema Khattak
D. Gulalai Ismail

77. Pakistan's first ever ice-hockey match was won by________.
A. GB Scouts
B. Pakistan's Air Force✓
C. Navy
D. Chitral Scouts

78. Renowned Urdu Scholar Dr. Saleem Akhtar died on________.
A. 28 December 2018
B. 29 December 2018
C. 30 December 2018✓
D. 31 December 2018

79. Which Pakistani woman Cricketer was named in ICC Women ODI Team of the Year 2018?
A. Javeria Khan B. Bisma Maroof
C. Sana Mir✓ D. Nain Abidi

80. Chief Justice Sardar Muhammad Shamim Khan is the _______.
A. 40th Chief Justice of Lahore High Court
B. 48th Chief Justice of Lahore High Court✓
C. 13th Chief Justice of Lahore High Court
D. 22nd Chief Justice of Lahore High Court

81. Pakistan is ________ largest sugar producer and eighth largest consumer in the world.
A. 4th **B. 5th✓**
C. 6th D. 7th

82. Pakistan declared 1,000 years old Hindu temple as national heritage, named:
A. Krishna Temple
B. Panj Tirath✓
C. Laxmi Temple
D. Nar Singh Mandir

83. What is the name of shelters for homeless which are being built by Govt of Pakistan?
A. Ashiana **B. Panah Gah✓**
C. Old House D. Shelter House

84. Which airways announced to resume flights to Pakistan after 10 years?
A. Norway Airlines
B. Australia Airways
C. British Airways ✓
D. None of these

85. According to 2018 report compiled by the Education Management Information System (EMIS), ________ girls quit primary schools in tribal districts.
A. 79pc✓ B. 89pc
C. 69pc D. 59pc

86. For how many years, former Pakistani Prime Minister Nawaz Sharif was sentenced to jail in Al-Azizia Reference on 24 Dec 2018?
A. 3 **B. 7✓**
C. 10 D. None of these

87. The Triangular Initiative Meeting held at Islamabad between Pakistan, Afghanistan and Iran, it was _________.
A. 11th Triangular Initiative Meeting
B. 12th Triangular Initiative Meeting
C. 13th Triangular Initiative Meeting✓
D. 14th Triangular Initiative Meeting

88. What is "Triangular Initiative Meeting" held at Islamabad on Dec 11-12 2018?
A. Drug control✓ B. Sports
C. Education D. Travelling facilities

89. Which founding member of Pakistan Women Cricket Team recently died in Dec 2018?
A. Nida Dar B. Shazia Khan
C. Sharmeen Khan✓
D. None of these

90. Shaikh Rasheed inaugurated "Rahman Baba Express" train, it will travel from Peshawar to________.
A. Sukkur **B. Karachi✓**
C. Kotri D. Larkana

91. Which bank proposed a $7.5-billion lending programme for Pakistan for next three years?
A. World Bank **B. ADB✓**
C. Islamic Bank D. AIIB

92. Pakistan plans to send first astronaut to space in________.
A. 2020 **B. 2022✓**
C. 2024 D. 2026

93. The Asian Development Bank (ADB) agreed to provide Rs_________ billion for the construction of Naulong Dam in Balochistan.
A. 25.6 billion **B. 26.6 billion✓**
C. 27.5 billion D. 28.5 billion

94. Pakistani Cricketer Yasir Shah became the fastest bowler to reach 200 wickets in Test Cricket breaking Australia's __________ record set 82 years ago.
A. Clarrie Grimmett✓
B. Bobby Simpson
C. Denis Lillie
D. Neil Harvey

95. According to World Bank Report 2018, trade between Pakistan and South Asia valued at___________.
A. $ 2 Billion B. $ 4 Billion
C. $ 5.1 Billion✓ D. $ 39.7 Billion

96. According to World Bank Report 2018, trade between Pakistan and India values little over 2 Billion, whereas without trade barriers, it could reach _________.
A. $25 Billion B. $31 Billion
C. $37 Billion✓ D. $48 Billion

97. According to Henley Passport Index 2018, Pakistani Passport has visa free access to how many countries?
A. 25 B. 30
C. 33✓ D. 40

98. The Supreme Court ordered the government of Pakistan not to appoint _____________ on top posts and to draft laws in this regard after approval from the cabinet?
A. Minority nationals
B. Dual nationals✓

C. An individual having age less than 25 years
D. All of the above

99. The Asian Development Bank (ADB) proposed a ________ lending programme for Pakistan for next three years on 14th Dec 2018.
A. $3 billion B. $5 billion
C. $7.5 billion✓ D. $10 billion

100. Who is the President of Pakistan Hockey Federation (PHF)?
A. Abdullah Sultan
B. Khalid Sajjad Khokhar✓
C. Muhammad Haroon
D. Tauqeer Dar

101. The 2018 ACC Emerging Teams Asia Cup was held in ________.
A. Pakistan B. India
C. Sri Lanka D. UAE
E. A & C✓

102. PM Imran Khan inaugurated shelter home for homeless people in ________ on 14th Dec 2018.
A. Hyderabad **B. Peshawar✓**
C. Quetta D. Rawalpindi

103. Chief Justice of Pakistan inaugurated the building of the Supreme Court's registry in ________ on 10th DEC 2018.
A. Turbat **B. Quetta✓**
C. Khuzdar D. Kalat

104. Which of the following Pakistani boy topped in the list of top security researchers who have contributed research to the Microsoft products and services?
A. Ahsan Mujtaba **B. Ashar Javed✓**
C. Ahmed Hussain D. Hamza Wajih

105. Who announced "sin" taxes on tobacoo and sugary drinks in Pakistan?
A. Aamir Mehmood Kiani✓
B. Asad Umar
C. Shireen Mazari
D. None of above

106. Which PTI minister resigned from his portfolio over accusations of being involved in occupying state land & alleged abuse of power?
A. Babar Awan
B. Azam Swati✓
C. Jahangir Tareen
D. Aleem Khan

107. How many times Pakistan won the "Blind Cricket World Cup"?
A. 0 B. 1
C. 2✓ D. 3

108. Which country's Prime Minister was asked by Donald Trump in a letter, to play his rule in resolving Afghan issue?
A. PM of India
B. PM of Pakistan✓
C. PM of Afghanistan
D. PM of Russia

109. LHC stays demolition of Punjab Governor House Wall on:
A. Dec. 1, 2018 B. Dec. 2, 2018
C. Dec. 3, 2018✓ D. Dec. 6, 2018

110. Pakistan was elected as a member for the council of ________ for a four-year term (2019-2022) after securing 155 out of a total of 177 votes in November 2018.
A. International Organisation for Migration
B. International Telecommunication Union✓
C. International Commission on Missing Persons
D. International Center for Migration Policy Development

111. China and Pakistan together launched the bus service to facilitate tourists as part of an initiative to connect both countries via road under the CPEC. The bus will travel from ________.
A. Lahore-Kashgar
B. Kashgar-Lahore
C. Karachi-Kashgar
D. Rawalpindi-Kashgar
E. A & B✓

112. Who was named as new chief Jamiat Ulema Islam Sami (JUIS) after assassination of previous chief Maulana Sami ul Haq?
A. Maulana Abdul Haq
B. Maulana Hamid ul Haq✓
C. Maulana Bashir Ahmed
D. Maulana Sultan Ahmed

113. Sardar Khalid Ibrahim passed away due to brain hemorrhage on 4th November 2018. He was a renowned politician from _____.
A. Gilgit Baltistan
B. Azad Jammu and Kashmir✓
C. FATA
D. Balochistan

114. Who is the current Chief Justice of Islamabad High Court?
A. Justice Iqbal Hameed-ur-Rahman
B. Justice Sheikh Najam-ul-Hassan
C. Justice Muhammad Anwar Khan Kasi
D. Justice Athar Minallah✓

115. Who holds the record of taking most wickets in a single test game by a Pakistani Bowler?
A. Imran Khan B. Yasir Shah

C. Muhammad Abbas
D. Saeed Ajmal
E. A & B✓

116. Pakistan has decided to build Kartarpur Corridor in Nankana Sahib. The corridor will provide visa-free access to the Indian ________ pilgrims to the shrine.
A. Muslim B. **Sikh✓**
C. Hindu D. Christian

117. Which former Indian Cricket star arrived in Pakistan to attend the groundbreaking ceremony of the Kartarpur Corridor in Nankana Sahib on 28th November 2018?
A. Kapil Dev
B. Navjot Singh Sidhu✓
C. Sunil Gavaskar
D. Sachin Tendulkar

118. The Human Resources Committee (HRC) of the World Bank Board has elected Pakistan's executive director ________ as its chairman for a period of two years.
A. Muhammad Nabi
B. Shahid Ashraf Tarar✓
C. Anwar Ali Qureshi
D. Abdul Majeed Sial

119. Who announced to launch and lead awareness campaign for family planning?
A. PM of Pakistan
B. CJP✓
C. Information Minister
D. Human Rights Minister

120. Terror attack on Chinese Consulate that was carried out on 23rd November 2018 was later foiled by a team of police officials led by ________.
A. SSP Naureen Akbar
B. SSP Suhai Aziz✓
C. SSP Aneela Qadir
D. SSP Fida Hussain Mastoi

121. Terror attack on Chinese Consulate that was carried out on 23rd November 2018 was claimed by ________.
A. TTP
B. Baloch Liberation Army✓
C. Sindhudesh Liberation Army
D. Baluch Liberation Front

122. How many terrorists were killed by security forces in the operation against terror attack on Chinese Consulate on 23rd November 2018?
A. 1 B. 9
C. 3✓ D. 7

123. Which provincial government decided to dissolve Provincial Ehtisab Commission and to transfer the Rs300 million allocated fund of Ehtisab Commission to Anti-Corruption Department?
A. Punjab **B. KP✓**
C. Sindh D. Balochistan

124. The route of new train "Shah Abdul Latif Bhittai Express" will be from ________ to ________.
A. Karachi, Kashmore
B. Karachi, Mirpurkhas✓
C. Karachi, Shahdadpur
D. Karachi, Bhit Shah

125. The route of new train "Sindh Express" will be from ________ to ________.
A. Karachi, Kashmore
B. Karachi, Sukkur✓
C. Karachi, Hyderabad
D. Karachi, Larkana

126. Haji Muhammad Abdul Wahab died on 18th November 2018. He was the chief of which organisation?
A. Dawat-e-Islami
B. Tableeghi Jamaat✓
C. Deobandi Jamaat
D. None of these

127. Final match of PSL-4 was played in ________ on 17th March 2019 as per official announcement by PCB?
A. Lahore **B. Karachi✓**
C. Abu Dhabi D. Dubai

128. How many matches of PSL-4 were played in Pakistan as per official announcement by PCB?
A. 3 B. 5
C. 8✓ D. 11

129. Pakistan signed MoU with ________ to partially abolish visa requirements on 21st November 2018.
A. Malaysia✓ B. China
C. S.Arabia D. UAE

130. Renowned poetess, writer, Fahmida Riaz passed away at age of_____ on November 21, 2018.
A. 70 B. 73
C. 74 **D. 72✓**

131. First Pakistani Lady Cop to receive 'Sword of Honour' is________.
A. Shaista Riffat B. Qurat-ul-Ain
C. Faryal Fareed✓ D. Soniya Noor

132. ICC dismissed Pakistan's case against India that the PCB had filed over BCCI's refusal to play with Team Green. The PCB had filed a compensation claim of ________ dollars?
A. 10 million B. 40 million
C. 70 million✓ D. 100 million

133. How many times Pakistan has borrowed from IMF since Dec 8, 1958?

A. 12 times B. 21 times✓
C. 27 times D. 33 times

134. When did Pakistan became member of IMF?
A. 1947 B. 1948
C. 1950✓ D. 1951

135. Which of the following Company get penalized by Supreme Court amounting for Rs100 million in dam fund?
A. Bahria Town
B. Nestle Pakistan
C. DG Cement✓
D. Dandot Cement

136. Pakistan and ________ signed an agreement to further strengthen their cooperation to deal with transnational organised crime, including drug trafficking, money laundering and human trafficking on 18th November 2018?
A. UAE✓ B. S.Arabia
C. China D. UK

137. Which country has shown its will to collaborate with Pakistan in fight against terrorism by carrying out joint border operations and putting in place an effective intelligence sharing mechanism on 18th November 2018?
A. Iran✓ B. India
C. Afghanistan D. Iraq

138. Which of the following provincial government imposed a ban on the manufacture, sale and purchase of non-biodegradable polythene bags in the province?
A. Punjab B. Sindh✓
C. KP D. Balochistan

139. Supreme Court of Pakistan ordered D.G Khan Cement Company Limited to deposit ________ into the SC Dam Fund as penalty in the Katas Raj pond case.
A. RS 300 million
B. RS 200 million
C. RS 100 million✓
D. RS 50 million

140. Which country announced to provide $4.6 million in grant-aid to Pakistan to support the supply of essential polio vaccine for the campaigns during the 2018-19?
A. Japan✓ B. China
C. S.Arabia D. Malaysia

141. Which of the following Pakistani woman featured on "BBC's 100 Women 2018" List?
A. Asma Jahangir
B. Ruth Pfau
C. Krishna Kumari✓
D. Malala Yusufzai

142. According to the Human Rights Watch (HRW) 2018 report, over ________ children are out of school in Pakistan.
A. 11.8 million B. 18.4 million
C. 22.5 million✓ D. 26.2 million

143. The Assets Recovery Unit (ARU) of the government traced over ________ fake bank accounts which were allegedly used to stash billions of dollars abroad.
A. 5000✓ B. 6000
C. 7000 D. 8000

144. Government's Assets Recovery Unit has identified properties of Pakistanis worth ________ in 10 countries.
A. 3.3 billion B. 4.4 billion
C. 5.3 billion✓ D. 6.3 billion

145. When did Imran Khan visited China in 2018?
A. 1 November to 5 November✓
B. 1 October to 5 October
C. 1 September to 5 September
D. 1 December to 5 December

146. According to NACTA, how many people killed in drone attacks since 2004 to 2018?
A. 2,500 B. 2,714✓
C. 2,890 D. 3,412

147. According to National Counter Terrorism Authority (NACTA), a total of ________ drone attacks have been conducted in Pakistan since January 2004 to 2018.
A. 209 B. 309
C. 409✓ D. 509

148. Which country will host SAFF (South Asian Football Federation) Championship in 2020?
A. Bangladesh B. India
C. Pakistan✓ D. UAE

149. Who is the leader of the opposition in National Assembly of Pakistan?
A. Khurshid Shah
B. Maulana Fazl-ur-Rehman
C. Shahbaz Sharif✓
D. Farooq Sattar

150. The National Highway Authority fetched over ________ by auctioning its 201 vehicles in Nov 2018.
A. Rs 200 million
B. Rs 210 million
C. Rs 220 million
D. Rs 213 million✓

Islamic Studies:

Al-Quran: It is the Holy Book which was sent by Allah to Hazrat Muhammad Rasool Allah Khatam-un-Nabiyeen (صلی اللہ علیہ وعلیٰ آلہٖ واصحٰبہٖ وسلم).

No. of Surahs in Holy Quran	:	114
No. of Paras in Holy Quran	:	30
No. of Ayats in Holy Quran	:	6666 In some books, 6236 Ayots are mentioned)
First Surah in Holy Quran	:	Surah-e-Fatiha
Last Surah in Holy Quran	:	Surah-e-Nas
Longest Surah in Holy Quran	:	Bakra
Shortest Surah in Holy Quran	:	Surah-e- Kausar
First revealed Surah	:	Surah Al-Alaq
The years to complete revelation	:	23 years
Rukoos	:	558 (In some books, 540 Rukoos are mentioned)
Number of Makki Surahs	:	87
Number of Madni Surahs	:	27
Author of Holy Quran	:	Allah Almighty

Name of Prophets mentioned in the Quran:

(1) Hazrat Adam (علیہ السلام)
(2) Hazrat Ayub (علیہ السلام)
(3) Hazrat Dawood (علیہ السلام)
(4) Hazrat Haroon (علیہ السلام)
(5) Hazrat Ibrahim (علیہ السلام)
(6) Hazrat Idrees (علیہ السلام)
(7) Hazrat Isa (علیہ السلام)
(8) Hazrat Ilyas (علیہ السلام)
(9) Hazrat Ishaq (علیہ السلام)
(10) Hazrat Ismail (علیہ السلام)
(11) Hazrat Loot (علیہ السلام)
(12) Hazrat Moosa (علیہ السلام)
(13) Hazrat Nooh (علیہ السلام)
(14) Hazrat Saleh (علیہ السلام)
(15) Hazrat Shuaib (علیہ السلام)
(16) Hazrat Sulaiman (علیہ السلام)
(17) Hazrat Yahya (علیہ السلام)
(18) Hazrat Yaqoob (علیہ السلام)
(19) Hazrat Yusuf (علیہ السلام)
(20) Hazrat Younus (Jones) (علیہ السلام)
(21) Hazrat Zakaria (علیہ السلام)
(22) Hazrat Zulkiff (علیہ السلام)
(23) Hazrat Hood (علیہ السلام)
(24) Hazrat Uzair (علیہ السلام)
(25) Hazrat Sheis (علیہ السلام)
(26) And the Khatam-un-Nabiyeen Prophet Hazrat Muhammad (صلی اللہ علیہ وآلہ وسلم)

Hazrat Muhammad Rasool Allah Khatam-un-Nabiyeen (صلی اللہ علیہ وعلیٰ آلہٖ واصحٰبہٖ وسلم):

Date of Birth	:	571 A.D. Makkah
Father's name	:	Hazrat Abdullah
Mother's name	:	Hazrat Aminah Bibi
Grandfather's name	:	Hazrat Abdul Mutalib
Uncle's Name	:	Hazrat Abu Talib
Foster Mother's name	:	Hazrat Halima
First wife's name	:	Hazrat Khadija (رضی اللہ عنہا)
Year of Nabowwat	:	610 A.D.
Year of Hijrat	:	622 A.D. (12th Rabi-ul-Awwal)
Year of Conguest of Makkah	:	629 A.D.
Year of Demise	:	632 A.D.
Age at the time of Nabowwat	:	40 years

Children of Khatam-un-Nabiyeen Holy Prophet (ﷺ):

SONS

1. Hazrat Qasim (رضی اللہ عنہ)
2. Hazrat Abdullah (Tahir) (رضی اللہ عنہ)
3. Hazrat Ibrahim (رضی اللہ عنہ)

DAUGHTERS

1. Hazrat Zainab (رضی اللہ عنہا)
2. Hazrat Ruqayyah (رضی اللہ عنہا)
3. Hazrat Um-i-Kalsoom (رضی اللہ عنہا)
4. Hazrat Fatima (رضی اللہ عنہا)

Important Articles of the Faith in Islam:

To believe that there is no God except Allah;
To believe in all of His Angels ;
To believe in all of His Prophets ;
To believe in all of His Books;
To believe in the Day of Resurrection;

Fundamental Principles of Islam: There are five fundamental principles of Islam. They are:

(1) The declaration of La--ila—ha-il--lal-la--hu mu-ham-ma-dur ra-su-lul-lah. This means there is no God but Allah and Muhammad is His Prophet.
(2) The observance of prayers five times a day.
(3) To distribute Zakat among the deserving people.
(4) To observe fast during the day time during the whole month of Ramazan.
(5) To perform Haj at Makkah at least once in life, if circumstances permit.

Kalima:

(1) Kalima Tayyabah
(2) Kalima Shahadat
(3) Kalima Tamjeed
(4) Kalima Tauheed
(5) Kalima Astaghfar
(6) Kalima Rad-e-Kufar

Namaz: It is special way of worship taught by Allah in the Holy Quran elucidated and explained practically by Prophet Muhammad (Peace Be Upon Him).

Fajr	:	04 Rakats	:	2 Sunnat, 2 Farz
Zuhr	:	12 Rakats	:	4 Sunnat, 4 Farz, 2 Sunnat, 2 Nafal
Asr	:	08 Rakats	:	4 Sunnat, 4 Farz
Maghrib	:	07 Rakats	:	3 Farz, 2 Sunnat, 2 Nafal
Isha	:	17 Rakats	:	4 Sunnat, 4 Farz, 2 Sunnat, 2 Nafal, 3 Witr (Wajeb), 2 Nafal

Juma Prayer: It is observed on every Friday.
Fasting: It is one of the five fundamentals of Islam. It means obstinence (Parhez).
Zakat: Zakat is one of the five fundamentals of Islam. It means purity and cleanliness.

Nisab of Zakat

Silver : 52½ tolas Gold : 7½ tolas

Some renowned Muslim Saints and Suffis :

- Hazrat Data Ganj Bakhsh (Syed Ali Hajweri) (رحمۃ اللہ علیہ) — Lahore (Pakistan)
- Hazrat Khwaja Muinuddin Chishti (رحمۃ اللہ علیہ) — Ajmer Sharif India)
- Hazrat Abdul Qadir Jilani (رحمۃ اللہ علیہ) — Baghdad (Iraq)
- Hazrat Shah Jilal (رحمۃ اللہ علیہ) — Sylhet (Bangladesh)
- Hazrat Nizam-ud-Din Aulia (رحمۃ اللہ علیہ) — Delhi (India)
- Hazrat Mujaddid Alf-e-Sani (رحمۃ اللہ علیہ) — Sirhind (India)

Sources of Islamic Laws :

(1) Al-Quran (2) Sunnat (Hadith) (3) Ijma__General consensus of Ulema
(4) Ijtihad (5) Qiyas

Main Sects in Islam:

- Sunni are those who follow the teachings of Prophet Muhammad (ﷺ).
- Shia are those who in addition to Prophet's teachings, give special attachment & reverence to Hazrat Ali(رضی اللہ عنہ).

Khulfa-e-Rashedin: The reign of the first four Khulfa of Islam *i.e.*

Name	Period of Khilafat
Hazrat Abu Bakr (رضی اللہ عنہ)	632-634 A.D.
Hazrat Umer (رضی اللہ عنہ)	634-644 A.D.
Hazrat Usman (رضی اللہ عنہ)	644-656 A.D.
Hazrat Ali (رضی اللہ عنہ)	656-661 A.D.

Hazrat Abu Bakr (رضی اللہ عنہ)

Birth	:	573 A.D.
Surname	:	Abu Bakr
Real name	:	Abdullah
Death	:	22 Jamadi-us-Sani (13 Hijra) 634 A.D.
Father's name	:	Usman Abu Qahafa
Mother's name	:	Salma Umm-ul-Khair

Hazrat Umer (رضی اللہ عنہ):

Birth	:	581 A.D.
Surname	:	Abu Hafs
Death	:	644 A.D.
Father's name	:	Khattab ibn Nufayl
Mother's name	:	Hantamah bint Hisham

Hazrat Usman (رضی اللہ عنہ):

Birth	:	573 A.D.
Belong	:	Banu Umayyah
Surname	:	Abu Amar
Father's name	:	Affan
Mother's name	:	Arvi Bint-e-Kuraiz
Death	:	656 A.D.

Hazrat Ali (رضی اللہ عنہ):

Father name	:	Abu Talib
Surname	:	Abu Turab
Death	:	Jan. 27, 661 A.D.
Father's name	:	Abi Talib
Mother's name	:	Fatima bint Asad

Generals in Islamic History :

Abu Sufiyan
Amir Hamza
Khalid-bin-Walid
Musa-bin-Naseer
Salah-ud-Din
Tariq-bin-Ziyad
Muhammad-bin-Qasim
Abu Ubaidah-bin-Jarah
Sad-bin-Waqas
Umer-bin-As
Sharjil-bin-Hassana
Abdur Rahman-bin-Abu Bakr
Akrama-bin-Abu Jahal

Muslim Calendar :

1. Moharram	2. Safar	3. Rabi-ul-Awwal	4. Rabi-us-Sani
5. Jamadi-ul-Awwal	6. Jamadi-us-Sani	7. Rajab	8. Shaaban
9. Ramazan	10. Shawwal	11. Ziqa'ad	12. Zilhaj

Important Angels: Angels are the creatures of Allah and they are made of light. They are invisible.

Hazrat Gibra'il (AS)	Who brought Allah's books, commands and messages to His Prophets.
Hazrat Meka'il (AS)	Incharge of protection and also to bring rains.
Hazrat Israfil (AS)	Who will blow the trumpet on the Day of Judgment.
Hazrat Izra'il (AS)	Incharge of taking the life of living creatures.

Other Important Angels :

Kiraman-Katabin	Incharge of right and left shoulders.
Munkar & Nakir	Incharge of grave.

Lineage of the Hazrat Muhammad Rasool Allah Khatam-un-Nabiyeen (صلی اللہ علیہ وعلیٰ آلہٖ واصحٰبہٖ وسلم):

Prophet Muhammad (Peace Be Upon Him) was the son of Hazrat Abdullah, who was the son of Hazrat Abdul Mutalib, who was the son of Hazrat Hashim, who was the son of Hazrat Abd Manaf.

Names of the Holy Books:

Taurat	revealed to Prophet Musa (AS).
Zabur	revealed to Prophet Daud (AS).

Injeel revealed to Prophet Isa (AS).
Quran-al-Karim revealed to Prophet Muhammad (ﷺ)

Books of Different Religions :

Revealed Religion	Holy Books
Islam	Al-Quran
Jewish	Taurat
Christianity	Injeel
Other Religions	
Hinduism	Vedas, Gita Puranas
Zoroastrianism	Zind-a-besta
Buddhism	Tripitak
Sikhism	Guru Granth Sahib

Names of Some Muslim Scholars:

Abu Kamil	A mathematician (Kitab-ul-Hind)
Al Farabi	A philosopher
Al Basudi	Geographer and Encyclopaedists
Al Bairuni	Geographer and Historian
Ibrahim-bin-Sina	Mathematician and Physician
Jabir-bin-Hayan	Chemist
Muhammad-bin-Musa	
Umer-i-Khayam	Mathematician
Yaqub-bin-Tariq	Astronomer
Yaqub Kundi	Musician

Ashra Mubashra: Those who were informed by the Khatam-un-Nabiyeen Holy Prophet (ﷺ) about the award of Paradise for them during their life-time are known as Ashra Mubashra. They are ten in number:

(1) Hazrat Abu Bakr (رضی اللہ عنہ) (2) Hazrat Umer Farooq (رضی اللہ عنہ)
(3) Hazrat Usman (رضی اللہ عنہ) (4) Hazrat Ali (رضی اللہ عنہ)
(5) Hazrat Abu Talha (رضی اللہ عنہ) (6) Hazrat Zubair ibn Awam (رضی اللہ عنہ)
(7) Hazrat Abu Obaida ibn-al-Jarah (رضی اللہ عنہ)(8) Hazrat Abdul Rehman ibn A'uf (رضی اللہ عنہ)
(9) Hazrat Sa'ad ibn Abi Waqas (رضی اللہ عنہ) (10) Hazrat Saeed ibn Zaid (رضی اللہ عنہ)

SACRED PLACES ETC:

Ka'aba: It is the first mosque at Makkah the oldest city in the world. There is a black stone (Hajr-e-Aswad) housed in this mosque. This stone is believed to have been brought from Heaven.

Bait-ul-Mukaddas. It is the Qibla Awwal.

Mount Hira. It is a cave in Makkah where angel Gibra'il for the first time revealed the Message of Allah to our Khatam-un-Nabiyeen Holy Prophet (ﷺ) at the age of 40.

Tur-e-Sina. It is the place (Mount Sinai) where Hazrat Musa (AS) Moses Prophet of Allah received Allah's message.

Janat-ul-Bakee. It is a graveyard where companions of the Khatam-un-Nabiyeen Holy Prophet (ﷺ) are buried.

SOME ISLAMIC TERMS:

1. **Islam.** It means complete submission to the will of Allah *i.e.* to submit to the orders of Allah and act with His commands.
2. **Mumins and Muslims.** Those who believe in Allah and obey Him.
3. **Musthhab.** Which is not clear rather it is correct or not.
4. **Makruh.** Mukruh is that which is not Haraam but is not appreciated.
5. **Kafar.** Anyone who does not believe in Allah, Islam (*i.e.* Tauhid, Prophets, Holy Revealed Books, Angels, Day of Judgment).
6. **Ramazan.** It is one of Islamic months specified for keeping fasts.

7. **Fasts.** They are observed during the holy month of Ramazan.
8. **Miraj Sharif.** One night, our Khatam-un-Nabiyeen Holy Prophet Muhammad (Peace Be Upon Him) by the order of Allah, travelled from Makkah to Bait-ul-Muqaddas and then from there to the seven heavens and beyond where Allah wanted him. The Khatam-un-Nabiyeen Holy Prophet (P.B.U.H) visited the Paradise and Hell and then returned to Makkah the same night. This is known as Miraj Sharif.
9. **Haraam.** Anything which is legally forbidden and absolutely proved to be so by Dalil-e-Qatai (undeniable argument). One who does it is Fasiq and deserves punishment.
10. **Makruh Tahrimi.** It is near about Haraam. It is forbidden and proved to be so by Dalil-e-Zanni, but who does not accept it is not Kafir but is very sinful.
11. **Makruh Tanzihi.** It is near about Hilal, the act of which brings God's blessings if avoided. If done, it is bad but not punishable.
12. **Mubah.** It is an act or doing of which brings neither any blessings nor punishment.
13. **Qira'at.** It is the recitation of the Holy Quran.
14. **Iman.** It means belief in Allah and all His qualities, angels, heavenly body and prophets by heart and to believe as true all that the Khatam-un-Nabiyeen Holy Prophet (Peace Be Upon Him) brought from Allah and to proclaim this belief.
15. **Kufr.** It is the act of not believing in any one of the important articles of Iman.
16. **Shirk.** It is the act of making somebody share in Allah's qualities or in his person.
17. **A'itikaf.** Staying in a mosque or at home in a separate room for devotion and prayers is called A'itikaf in the last ten days of the month of Ramazan.
18. **Zakat.** It is that part of the wealth which is given away to the poor according to Allah's order. It is worked out at the rate of 2½% on 7½ Tola gold or 52½ Tola silver which remains with one for full one year.
19. **Sadaqa-e-Fitr.** It is that amount which is paid after the expiry of Ramazan on Eid day as a mark of gratitude. It is worked out equivalent to the marked value of two kilos of wheat on that day, and must be paid before Eid Prayer.

SOME MUSLIM HISTORIANS :

1. Abu Abdullah Muhammad Bin Umer Al-Waqdi, 747 A.D.
2. Ibne Sa'd-Abu Abdullah Al Basri 845 A.D.
3. Ahmed Bin Yahya Bin Jaber Al Balazri, 892 A.D.
4. Ibn Qatbah Abu Abad Muhammad Bin Muslim Al Kuni, 828 A.D. to 889 A.D.
5. Ahmed Bin Abi Yaqub Yaqubi, 897 A.D.
6. Uzzud Din Abdul Hassan Ibne Taser 1160 A.D. to 1234 A.D.
7. Abu Jaffer Muhammad Bin Jareer Tabri, 893 A.D. to 922 A.D.
8. Ibn-e-Khalmqan, 1211 A.D. to 1282 A.D.
9. Ibn-ul-Jozi, 1116 A.D. to 1201 A.D.
10. Ibn-e-Kaseer, 1301 A.D. to 1373 A.D.
11. Jalal-ud-Din Siyuti, 1445 to 1506 A.D.

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SOME MUSLIM SCHOLARS AND SCIENTISTS

(i) ALLAMA DR. MUHAMMAD IQBAL (1877-1938): Born in Sialkot (Pakistan). After taking early education in Pakistan, took his Ph.D. degree from Germany. Regarded as one of the greatest philospher poets of the world. His national poetry inspired the Muslims to freedom. Wrote many poetical works, e.g. Bang-e-Dara, Bal-e-Jibreel, Zarb-e-Kalim, Zabur-e-Ajam etc.

(ii) Al-FARABI (870-950 A.D.): Born in Transoxiana in 870 A.D. He travelled widely and studied Aristotle and Plato and wrote many commentaries on these Greek philosphers. His works include al-Siyasha-al-Madaniyah (a treatise on political economy), Risala Fusus-al-Hakima (Gems of Wisdom) and Kitab-al-Musiqi-al-Kabir.

(iii) AL-RAZI (865-925 A.D.): Born at Rayy (Iran) in 865 A.D. He is regarded as one of the greatest physicians of medieval age. His books on medical science include Kitab-al-Hawi (the comprehensive book) in 20 volumes and Kitab-al-Asrar (the book of secrets).

(iv) **IBN-ARABI (1165-1240 A.D.):** Born in Murcia (Spain) in 1165 A.D. He was a great scholar, mystic and theologian. He travelled extensively and visited Baghdad, Mosal, Egypt, Asia Minor and Arabia. His book Al-Futuhat Al-Makkiya (Makkah Revelations) is very important.

(v) **IBN-KHALDUN (1332-1406 A.D.):** Born in Tunis in 1332 A.D. He is ranked among the greatest historians of all ages. Considered as the father of sociology. His Muqaddimah (Preface) of his work Kitab-al-Ibar contains his theory about the rise and fall of societies. He also served as Grand Qazi of Egypt.

(vi) **IBN-SINA (980-1037 A.D.):** Born near Bukhara. He was the greatest Muslim physician and scholar. Known as Avicenna in Europe. He wrote many works of which Kitab-ul-Shifa (the book of healing) and Kitab-ul-Insaf are important treatises on medicine and philosophy respectively.

(vii) **JABIR IBN-HAYYAN (777-813 A.D.):** Born near Kufah in 777 A.D. Discovered Sulphuric Acid, Nitric Acid, Aqua Regia etc. Regarded as the father of Chemistry. He obtained many substances like Antimony, Soda, Boric, Arsenic and Alum in pure form. His works include Kitab-al-Tajmi (Book of Concentration), Kitab-al-Rahmah and al-Zibaq-al-Sharqi.

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THE HOLY QURAN & HADITH

Q. What is the importance of the Holy Quran?

Ans. The Holy Quran is the sacred book which was revealed to the Khatam-un-Nabiyeen Holy Prophet Muhammad (ﷺ). This divine book comprises of precepts of Islam which serve as a code of conduct for the Muslims. Billions of Muslims all over the world recite Holy Quran regularly. Thus it is the book which is read by majority of the world population.

Q. Which angel brought the divine revelation to the Khatam-un-Nabiyeen Holy Prophet (ﷺ)?

Ans. Hazrat Jibrael (AS).

Q. What was the age of the Khatam-un-Nabiyeen Holy Prophet (ﷺ) when he received the first revelation?

Ans. Forty years.

Q. At which place, the Khatam-un-Nabiyeen Holy Prophet (ﷺ) received the first revelation?

Ans. Cave Hira (Ghar-e-Hira).

Q. What was the first revelation?

Ans. Translation, "Read in the name of Allah".

Q. In which month, the Khatam-un-Nabiyeen Holy Prophet (ﷺ) received the first revelation?

Ans. On the 17th of the month of Ramadan.

Q. How much time it took for the complete revelation of the Holy Quran?

Ans. 22 years, 2 months and 22 days.

Q. What is the total number of Paras in the Holy Quran?

Ans. Thirty.

Q. What is the total number of Surahs in the Holy Quran?

Ans. 114.

Q. What is the number of Ayats in Holy Quran?

Ans. 6236 (In some books the no. of Ayats is given 6666).

Q. Which is the first Surah of the Holy Quran?

Ans. Surah Al-Fatah.

Q. Which is the last Surah of the Holy Quran?

Ans. Surah Al-Nas.

Q. Which is the longest Surah of the Holy Quran?

Ans. Surah Al-Baqrah.

Q. Which is the shortest Surah of the Holy Quran?

Ans. Surah Al-Kausar.

Q. Name the Surah of the Holy Quran which was first revealed to the Khatam-un-Nabiyeen Holy Prophet (ﷺ).

Ans. Surah Al-Alaq.

Q. Which Surah was the last to be revealed?

Ans. Surah Al-Nasr.

Q. What is the number of Makki Surahs?

Ans. 87.

Q. What is the number of Madni Surahs?

Ans. 27.

Q. What is the name of those words in the Holy Quran whose meaning was not disclosed by the Khatam-un-Nabiyeen Holy Prophet (ﷺ)?

Ans. Haroof-e-Mukatiyat.

Q. How many stages are there in the Holy Quran?

Ans. Seven stages.

Q. What is the name of the night in which the Holy Quran was first revealed?

Ans. Laila-tul-Qadar.

Q. What is the number of Surahs in the first stage of the Holy Quran?

Ans. Seven.

Q. How many Surahs are there in the second stage of the Holy Quran?

Ans. Five.

Q. What is the total number of Surahs in the

third, fourth, fifth, sixth and seventh stage of the Holy Quran?

Ans. Seven, Fifteen, Eleven, Thirteen and Fifty-Six, respectively.

Q. What is the total number of "Ruku" in the Holy Quran?

Ans. 558 (According to some books 540).

Q. What is the total number of Ayat-e-Waada in the Holy Quran?

Ans. 1,000.

Q. What is the total number of Ayat-e-Tasbeeh in the Holy Quran?

Ans. 100.

Q. What is the total number of Sajdah-e-Talawat in the Holy Quran?

Ans. Fourteen.

Q. What is the total number of Alphabets (Haroof) in the Holy Quran?

Ans. 32,06,270.

Q. What is the total number of Kallmat in the Holy Quran?

Ans. 86,430.

Q. Which Surah is called "Bab-ul-Quran"?

Ans. Surah Al-Fatah.

Q. For how many times advice has been given for the prayer (Salat)?

Ans. Seven hundred (700).

Q. Which Surah is called the Heart of Holy Quran?

Ans. Surah Yaseen.

Q. Which Sahabi (Companion) was the first Hafiz of the Holy Quran?

Ans. Hazrat Usman (رضی اللہ عنہ).

Q. Which Para contains the first Sajidah Talawat?

Ans. Para number nine.

Q. How many Parahs of Holy Quran commence with Haroof-e-Mukatiyat?

Ans. Two.

Q. How many Surahs start with Haroof-e-Mukatiyat?

Ans. Five.

Q. Which Surah of Holy Quran does not begin with Bismillah?

Ans. Surah Al-Taubah.

Q. According to Surah Al-Younas in how many days Allah created the universe?

Ans. Six days.

Q. How many doors does the Hell has according to the Holy Quran?

Ans. Seven.

Q. Which Surah is named after the name of a canal in the Paradise?

Ans. Surah Al-Kausar.

Q. Which Surah contains the mention of Yajooj Majooj?

Ans. Surah Al-Ambia.

Q. Which Surah was being recited by the sister of Hazrat Umer (رضی اللہ عنہ) after listening to which he embraced Islam?

Ans. Surah Al-Taha.

Q. Which Surah had been recited by Hazrat Jaffar Tayyar before King Najashi?

Ans. Surah Al-Mariam.

Q. How many Surahs of the Holy Quran begin with the word "Subhan"?

Ans. Seven.

Q. Which Surah was completed first of all?

Ans. Surah Al-Fatah.

Q. What is meant by Rooh-ul-Amin?

Ans. It is the title of Hazrat Jibrael (AS) as mentioned in the Holy Quran.

Q. Which Caliph started the work of the compilation of the Holy Quran in written form?

Ans. Hazrat Abu Bakr (رضی اللہ عنہ).

Q. Which Parah of the Holy Quran contains the first Sajdah-e-Talawat?

Ans. Parah Number Nine.

Q. Which Sahabi (Companion of Khatam-un-Nabiyeen Holy Prophet) is given the name of Jamia-ul-Quran?

Ans. Hazrat Usman Ghani (رضی اللہ عنہ).

Q. What is the number of the Sahaba Karam who got the honour of writing the divine revelation?

Ans. 35.

Q. What is the number of the Muslim ladies who learnt the Holy Quran by heart (Hafiz-e-Quran) during the period of the Khatam-un-Nabiyeen Holy Prophet (صلی اللہ علیہ وسلم)?

Ans. Four ladies namely:

(1) Umul Momineen Hazrat Ayeshah Siddiqah (رضی اللہ عنہا).

(2) Umul Momineen Hazrat Hifsa (رضی اللہ عنہا).

(3) Umul Momineen Hazrat Um-e-Salma (رضی اللہ عنہا).

(4) Ume Warqa bin Naufal (رضی اللہ عنہا).

Q. Who translated Holy Quran into the Persian language?

Ans. The Holy Quran was translated into Persian by Hazrat Shah Wali Ullah.

Q. When was the Holy Quran first translated into Urdu?

Ans. Hazrat Shah Rafi-ud-Din translated the Holy Quran into Urdu in the year 1776.

Q. In which language was the Holy Quran translated first of all?

Ans. Latin language

Q. In which year, the Holy Quran was recorded in the Kufi script?

Ans. 160 A.H.

Q. Give the name of the stage of the Holy Quran in which Surah Al-Yaseen is located.

Ans. In the 5th stage.

Q. How many Surahs of the Holy Quran consist of only one Ruku each?

Ans. 36 Surahs.

Q. Which Ghazwah has been mentioned in the Surah Al-Imran?

Ans. Ghazwah Uhad (Battle of Uhad).

Q. Magicians of which country have been mentioned in Surah Al-Alraf?

Ans. Egypt.

Q. In which Ayat of Surah Al-Hood, Hazrat Noah (AS) was ordered to prepare a boat?

Ans. 37th Ayat of Surah Al-Hood.

Q. What is the colour of the clothes of the resident of Paradise?

Ans. Green.

Q. Give the name of that Surah of the Holy Quran which contains Bismillah twice.

Ans. Surah Al-Namal.

Q. Which Surah contains the narrative of the defeat of Abraha?

Ans. Surah Al-Feel.

AL-HADITH

Q. What is the literal meaning of the term Al-Hadith?

Ans. Al-Hadith is the saying of Khatam-un-Nabiyeen Holy Prophet (ﷺ) which is narrated by any of his Companions (Sahaba Karam).

Q. What is a Musnad?

Ans. It is a type of Hadith in which narration reaches a Sahabi through authenticated narrators in a continuous manner.

Q. What is "Musalsal Halaf"?

Ans. It is a Hadith in which all narrators take hand in hand while narrating in order to give surety.

Q. Define "Musalsal Aleed".

Ans. In this type of Hadith, all narrators take hand in hand while narrating to give surety.

Q. What is Hadith Mutasil?

Ans. In this Hadith, chain of narrators is complete without a break.

Q. Define "Hadith Munqatah".

Ans. In Hadith Munqatah, the chain of narrators is broken at a Tabee.

Q. What is Hadith Mursil?

Ans. In this Hadith, the chain of narration should break at a Sahabi only viz. the Tabee must quote directly from the Khatam-un-Nabiyeen Holy Prophet (ﷺ).

Q. What is Hadith Muzil?

Ans. In this Hadith, two or more than two narrators may be unknown.

Q. What is Hadith Mu'anan?

Ans. In this Hadith, a narrator must use the word UN while narrating.

Q. Define Hadith Muajam?

Ans. It is the Hadith in which the narrator does not know the name of another narrator and uses the word 'Rajal'.

Q. Give the names of the six books which are called Sahah-e-Sitta.

Ans.
(1) Sahih Bukhari
(2) Sahih Muslim
(3) Sunan Abu Daud
(4) Sunan Tirmzi
(5) Sunan Nisai
(6) Sunan Ibn-e-Majah

Q. What is Sahih Bukhari?

Ans. It is considered the most authentic book on Hadith. Imam Muhammad bin Ismail Bukhari compiled this book which comprises of 9,082 Ahadith.

Q. What is Sahih Muslim?

Ans. Imam Muslim Qasheeri Nishapuri compiled this work which consists of about 4,000 Ahadith. Sahih Muslim is regarded as the second most authentic work after Sahih Bukhari.

Q. Throw light on Sunan 'Tirmzi'.

Ans. It is a collection of Ahadith which was compiled by Imam Muhammad bin Isa Tirmzi.

Q. What is Sunan Abu Daud?

Ans. Imam Abu Daud Sajistani compiled this work of Ahadith. There are 4,800 Ahadith in this collection.

Q. What is Sunan Nisai?

Ans. This collection of Ahadith is the work of Imam Abu Abdul Rehman Ahmed bin Shoaib Nisai. It contains 5,761 Ahadith.

Q. Sunan Ibn-e-Majah is great work of Hadith which is distinguish for its beautiful arrangement. Comment.

Ans. Imam Muhammad Abu Abdullah Ibn Majah compiled this work which comprises of 4,000 Ahadith. In this book, the Ahadith have been arranged in a beautiful manner.

Q. What is the importance of Ahadith?

Ans. Hadith is the second most authentic source of Islamic jurisprudence.

Q. Give the types of Hadith in term of meaning.

Ans. There are three types:
(1) Hadith Qauli (2) Hadith Faeli
(3) Hadith Taqriri

Q. Give the types of Hadith in term of 'Sanad'.

Ans. There are three types:
(1) Hadith Marfu (2) Hadith Mauqoof
(3) Hadith Maqtu

Q. Give the types of Hadith in term of narrators.
Ans. There are four types:
(1) Hadith Matwatar (2) Hadith Mashhoor (3) Hadith Aziz (4) Hadith Ghareeb

Q. What is Sahih?
Ans. It is the Hadith whose narrators are Adil and whose sanad is Mutasil.

Q. Give the number of Ahadith which have been narrated by Hazrat Abu Hurairah (رضي الله عنه).
Ans. 5,374.

Q. How many Ahadith are related to Hazrat Ayeshah (رضي الله عنها)?
Ans. 2,210.

Q. What is meant by the word Tabaeen?
Ans. The Tabi'un-meaning "followers" — are the generation of Muslims who were born after the passing of Prophet Muhammad (ﷺ) but who were contemporaries of the Sahaba ("companions").

Q. Give the names of Aema Muhaddaseen.
Ans. Imam Abu Hanifah, Imam Ahmed bin Hanbal, Asad bin Musa, Usman bin Abi Shaibah and Ishaq bin Rahu etc.

Expected Questions Sure Shot+

1. In which Surah of Quran, there is mention of Zulqarnain?
(A) A'ssuff (B) **Alkahaf✓**
(C) Al Mujadala (D) Al Imran

2. Muslims are the best of all due to:
(A) Justice (B) Simplicity
(C) **Truthfulness✓** (D) Moderation

3. Sahib Us-Ser is the nickname of:
(A) **Hazrat Huzaifa (R.A)✓**
(B) Hazrat Uqba (R.A)
(C) Hazrat Saad (R.A)
(D) Hazrat Khuzaifa (R.A)

4. Masjid-e-Khaif is located in:
(A) Muzdilifa (B) Arafat
(C) **Mina✓** (D) None

5. Ghassel-ul-Malaika is the title of:
(A) Hazrat Abu Talha (R.A)
(B) Hazrat Khuzaifa (R.A)
(C) **Hazrat Hanzala (R.A)✓**
(D) Hazrat Jaffar (R.A)

6. Who was the grandfather of the Khatam-un-Nabiyeen Holy Prophet (PBUH)?
(A) Hazrat Abu Talib
(B) Hazrat Abbas (RA)
(C) **Hazrat Abdul Muttalib✓**

7. Who was a historian, jurist, philosopher, as well as a politician?
(A) Shams-ud-Din Ibn-i-Khalkan
(B) **Abdur Rehman Ibn Khaldoon✓**
(C) Abu Bakar Muhammad Ibn-i-Yahya

8. When law of inheritence was revealed?
(A) Three Hijrah
(B) **Four Hijrah✓**
(C) Five Hijrah (D) Six Hijrah

9. Who was the last Commander-in-Chief for Ghazwa-e-Mautah?
(A) **Hazrat Khalid bin Waleed (R.A)✓**
(B) Abdur Rehman bin Auf (R.A)
(C) Abdullah bin Rawaha (R.A)

10. Whose title is Asad-ullah?
(A) Omar (R.A) (B) **Ali (R.A) ✓**
(C) Usman (R.A)

11. Who was born inside Kaaba?
(A) Zaid (R.A) (B) Usman (R.A)
(C) **Ali (R.A) ✓**

12. Ali (R.A) was married to Fatima (R.A) in?
(A) 5 Hijrah (B) **2 Hijrah✓**
(C) 4 Hijrah

13. Africa was conquered in the reign of?
(A) Omar (R.A) (B) **Usman (R.A)✓**
(C) Ali (R.A)

14. Hazrat Usman (R.A) migrated?
(A) Thrice (B) Once (C) **Twice✓**

15. Corpse of Usman (R.A) remained unburied for?
(A) **3 days✓** (B) 5 days
(C) 1 days

16. Usman (R.A) was younger to the Prophet (S.A.W) by?
(A) 3 years (B) 4 years

(C) 5 years✓

17. **Who liberated Bilal (R.A)?**
(A) Omar (R.A)
(B) Abu Bakr (R.A) ✓
(C) Ali (R.A)

18. **First to accept Islam among men was?**
(A) Ali (R.A)✓ (B) Zaid (R.A)
(C) Abu Bakr (R.A)

19. **Younas (A.S) remained in the belly of the whale?**
(A) 20 days (B) 40 days✓
(C) 10 days

20. **Messengers mentioned in the Quran are?**
(A) 23 (B) 25✓
(C) 28

21. **Which Prophet is most mentioned in the Holy Quran?**
(A) Jesus (A.S)
(B) Dawood (A.S)
(C) Moses (A.S) ✓

22. **"Sahaif" revealed on Idress (A.S) were?**
(A) 30✓ (B) 40
(C) 50

23. **Who is called "Khateeb-ul-Anbia"?**
(A) Hood (A.S) (B) Nuh (A.S)
(C) Shoaib (A.S) ✓

24. **Who could play flute very well?**
(A) Hood (A.S)✓ (B) Nuh (A.S)
(C) Yaqoob (A.S)

25. **Who is called "Zul-Nun"?**
(A) Moosa (A.S)
(B) Younas (A.S)✓
(C) Jesus (A.S)

26. **Which Messenger made "Soap"?**
(A) Younas (A.S) (B) Nuh (A.S)
(C) Saleh (A.S) ✓

27. **"Sahaif" revealed on Ibrahim (A.S) were?**
(A) 3✓ (B) 4
(C) 5

28. **Ayub (A.S) was well-known for?**
(A) Tolerance (B) Patience✓
(C) Love

29. **How many Prophets came to Bani-Israil?**
(A) 50 thousand (B) 60 thousand
(C) 70 thousand✓

30. **Who conquered Egypt?**
(A) Amar bin Al-Aas (R.A)✓
(B) Ali (R.A) (C) Usman (R.A)

31. **Banu Ghassan is in?**
(A) Iraq✓ (B) Syria
(C) Egypt

32. **Battle of Yamama was fought against?**
(A) Romans (B) Egyptians
(C) Musailma Kazzab✓

33. **Who penned down peace treaty on the conquest of Jerusalem?**
(A) Omar (R.A)✓ (B) Ali (R.A)
(C) Khalid Bin Walid (R.A)

34. **Koofa was built on the orders of?**
(A) Usman (R.A) (B) Ali (R.A)
(C) Omar (R.A)✓

35. **Tripoli was conquered in the reign of?**
(A) Usman (R.A)✓ (B) Omar (R.A)
(C) Ali (R.A)

36. **Which battle decided the fate of Syria?**
(A) Badr (B) Yarmuk
(C) Hunain✓

37. **Omar (R.A) established regular military institution in?**
(A) 10 Hijrah (B) 13 Hijrah
(C) 15 Hijrah✓

38. **Muslims martyred in the war against Musailma Kazzab were?**
(A) 12000 (B) 1500
(C) 1300
(D) 1000✓

39. **When Usman (R.A) accepted Islam, what was his age?**
(A) 30 years (B) 34 years✓
(C) 40 years

40. **Abu Ayub Ansari (R.A) is buried in?**
(A) Mecca (B) Egypt
(C) Constantinople✓

41. **Which battle was fought between Ali (R.A) and Ameer Muawiya (R.A)?**
(A) Safeen✓ (B) Jaml (C) Mota

42. **Mother of Hazrat Ali (R.A) was?**
(A) Asma (R.A)
(B) Fatima (R.A)✓
(C) Salma (R.A)

43. **Bait-ul-Muqaddas was conquered in the reign of?**
(A) Abu Bakr (R.A) (B) Ali (R.A)
(C) Omar (R.A)✓

44. **Wife of Usman (R.A) was?**
(A) Nayla (R.A)
(B) Ruqayya (R.A)✓
(C) Zainab (R.A)

45. **Length of the Ameer-ul-Momenin canal is?**
(A) 90 miles (B) 99 miles✓
(C) 79 miles

46. **Rate of Zakat is?**
(A) 2% (B) 3% (C) 2 1/2%✓

47. **House of Usman (R.A) remained besieged for?**
(A) 40 days✓ (B) 45 days
(C) 30 days

48. **Ali (R.A) changed his capital from Madina to?**
(A) Syria (B) Koofa✓
(C) Basra

49. **Khusro Pervaiz was the king of?**
(A) Rome (B) Egypt
(C) Iran✓

50. **Najeebullah is the title of:**
(A) Hazrat Yahya (AS)
(B) Hazrat Yaqoob (AS)
(C) Hazrat Shoaib (AS)
(D) None✓

Geography:

Geography is a field of science devoted to the study of the lands, the features, the inhabitants, and the phenomena of Earth. The first person to use the word "γεωγραφία" was Eratosthenes (276–194 BC). Geography is an all-encompassing discipline that seeks an understanding of the Earth and its human and natural complexities—not merely where objects are, but how they have changed and come to be. It is often defined in terms of the two branches of human geography and physical geography. The four historical traditions in geographical research are: spatial analyses of natural and the human phenomena, area studies of places and regions, studies of human-land relationships, and the Earth sciences. Geography has been called "the world discipline" and "the bridge between the human and the physical sciences".

Introduction

Geography is a systematic study of the Earth and its features. Traditionally, geography has been associated with cartography and place names. Although many geographers are trained in toponymy and cartology, this is not their main preoccupation. Geographers study the space and the temporal database distribution of phenomena, processes, and features as well as the interaction of humans and their environment. Because space and place affect a variety of topics, such as economics, health, climate, plants and animals, geography is highly interdisciplinary. The interdisciplinary nature of the geographical approach depends on an attentiveness to the relationship between physical and human phenomena and its spatial patterns.

Names of places...are not geography...know by heart a whole gazetteer full of them would not, in itself, constitute anyone a geographer. Geography has higher aims than this: it seeks to classify phenomena (alike of the natural and of the political world, in so far as it treats of the latter), to compare, to generalize, to ascend from effects to causes, and, in doing so, to trace out the laws of nature and to mark their influences upon man. This is 'a description of the world'—that is Geography. In a word Geography is a Science—a thing not of mere names but of argument and reason, of cause and effect.

Geography as a discipline can be split broadly into two main subsidiary fields: human geography and physical geography. The former largely focuses on the built environment and how humans create, view, manage, and influence space. The latter examines the natural environment, and how organisms, climate, soil, water, and landforms produce and interact. The difference between these approaches led to a third field, environmental geography, which combines physical and human geography and concerns the interactions between the environment and humans.

BRANCHES

Physical geography

Physical geography (or physiography) focuses on geography as an Earth science. It aims to understand the physical problems and the issues of lithosphere, hydrosphere, atmosphere, pedosphere, and global flora and fauna patterns (biosphere).

Human geography

Human geography is a branch of geography that focuses on the study of patterns and processes that shape the human society. It encompasses the human, political, cultural, social, and economic aspects.

- **Human geography can be divided into many broad categories, such as:**

Various approaches to the study of human geography have also arisen through time and include:

- Behavioral geography
- Feminist geography
- Culture theory
- Geosophy

Integrated geography

Integrated geography is concerned with the description of the spatial interactions between humans and the natural world. It requires an understanding of the traditional aspects of physical and human geography, as well as the ways that human societies conceptualize the environment. Integrated geography has emerged as a bridge between the human and the physical geography, as a result of the increasing specialisation of the two sub-fields. Furthermore, as human relationship with the environment has changed as a result of globalization and technological change, a new approach was needed to understand the changing and dynamic relationship. Examples of areas of research in the environmental geography include: emergency management, environmental management, sustainability, and political ecology.

Geomatics

Geomatics is concerned with the application of computers to the traditional spatial techniques used in cartography and topography. Geomatics emerged from the quantitative revolution in geography in the mid-1950s. Today, geomatics methods include spatial analysis, Geographic Information systems (GIS), Remote sensing, and Global positioning systems (GPS). Geomatics has led to a revitalization of some geography departments, especially in Northern America where the subject had a declining status during the 1950s.

Regional geography

Regional geography is concerned with the description of the unique characteristics of a particular region such as it natural or human elements. The main aim is to understand, or define the uniqueness, or character of a particular region that consists of natural as well as human elements. Attention is paid also to regionalization, which covers the proper techniques of space delimitation into regions.

Related fields

- Urban planning, regional planning, and spatial planning: Use the science of geography to assist in determining how to develop (or not develop) the land to meet particular criteria, such as safety, beauty, economic opportunities, the preservation of the built or natural heritage, and so on. The planning of towns, cities, and rural areas may be seen as applied geography.
- Regional science: In the 1950s, the regional science movement led by Walter Isard arose to provide a more quantitative and analytical base to geographical questions, in contrast to the descriptive tendencies of traditional geography programs. Regional science comprises the body of knowledge in which the spatial dimension plays a fundamental role, such as regional economics, resource management, location theory, urban and regional planning, transport and communication, human geography, population distribution, landscape ecology, and environmental quality.
- Interplanetary Sciences: While the discipline of geography is normally concerned with the Earth, the term can also be informally used to describe the study of other worlds, such as the planets of the Solar System and even beyond. The study of systems larger than the Earth itself usually forms part of Astronomy or Cosmology. The study of other planets is usually called planetary science. Alternative terms such as Areology (the study of Mars) have been proposed but are not widely used.

Techniques

As spatial interrelationships are key to this synoptic science, maps are a key tool. Classical cartography has been joined by a more modern approach to geographical analysis, computer-based geographic information systems (GIS).

In their study, geographers use four interrelated approaches:

- Systematic — Groups geographical knowledge into categories that can be explored globally.
- Regional — Examines systematic relationships between categories for a specific region or location on the planet.
- Descriptive — Simply specifies the locations of features and populations.
- Analytical — Asks *why* we find features and populations in a specific geographic area.

Cartography

Cartography studies the representation of the Earth's surface with abstract symbols (map making). Although other subdisciplines of geography rely on maps for presenting their analyses, the actual making of maps is abstract enough to be regarded separately. Cartography has grown from a collection of drafting techniques into an actual science.

Cartographers must learn cognitive psychology and ergonomics to understand which symbols convey information about the Earth most effectively, and behavioural psychology to induce the readers of their maps to act on the information. They must learn geodesy and fairly advanced mathematics to understand how the shape of the Earth affects the distortion of map symbols projected onto a flat surface for viewing. It can be said, without much controversy, that cartography is the seed from which the larger field of geography grew. Most geographers will cite a childhood fascination with maps as an early sign they would end up in the field.

Geographic information systems

Geographic information systems (GIS) deal with the storage of information about the Earth for automatic retrieval by a computer, in an accurate manner appropriate to the information's purpose. In addition to all of the other subdisciplines of geography, GIS specialists must understand computer science and database systems. GIS has revolutionized the field of cartography: nearly all mapmaking is now done with the assistance of some form of GIS software. GIS also refers to the science of using GIS software and GIS techniques to represent, analyse, and predict the spatial relationships. In this context, GIS stands for Geographic Information Science.

Remote sensing

Remote sensing is the science of obtaining information about Earth features from measurements made at a distance. Remotely sensed data comes in many forms, such as satellite imagery, aerial photography, and data obtained from hand-held sensors. Geographers increasingly use remotely sensed data to obtain information about the Earth's land surface, ocean, and atmosphere, because it: a) supplies objective information at a variety of spatial scales (local to global), b) provides a synoptic view of the area of interest, c) allows access to distant and inaccessible sites, d) provides spectral information outside the visible portion of the electromagnetic spectrum, and e) facilitates studies of how features/areas change over time. Remotely sensed data may be analysed either independently of, or in conjunction with other digital data layers (e.g., in a Geographic Information System).

Quantitative methods

Geostatistics deal with quantitative data analysis, specifically the application of statistical methodology to the exploration of geographic phenomena. Geostatistics is used extensively in a variety of fields, including hydrology, geology, petroleum exploration, weather analysis, urban planning, logistics, and epidemiology. The mathematical basis for geostatistics derives from cluster analysis, linear discriminant analysis and non-parametric statistical tests, and a variety of other subjects. Applications of geostatistics rely heavily on geographic information systems, particularly for the interpolation (estimate) of unmeasured points. Geographers are making notable contributions to the method of quantitative techniques.

Qualitative methods

Geographic qualitative methods, or ethnographical research techniques, are used by human geographers. In cultural geography there is a tradition of employing qualitative research techniques, also used in anthropology and sociology. Participant observation and in-depth interviews provide human geographers with qualitative data.

History

The oldest known world maps date back to ancient Babylon from the 9th century BC. known Babylonian world map, however, is the *Imago Mundi* of 600 BC. The map as by Eckhard Unger shows Babylon on the Euphrates, surrounded by a circular showing Assyria, Urartuand several cities, in turn surrounded by a "bitter river" (Oceanus), islands arranged around it so as to form a seven-pointed star. The accompanying tex[illegible] outer regions beyond the encircling ocean. The descriptions of five of them have su[illegible]

to the *Imago Mundi*, an earlier Babylonian world map dating back to the 9th century BC depicted Babylon as being further north from the center of the world, though it is not certain what that center was supposed to represent.

The ideas of Anaximander (c. 610 BC-c. 545 BC): considered by later Greek writers to be the true founder of geography, come to us through fragments quoted by his successors. Anaximander is credited with the invention of the gnomon, the simple, yet efficient Greek instrument that allowed the early measurement of latitude. Thales is also credited with the prediction of eclipses. The foundations of geography can be traced to the ancient cultures, such as the ancient, medieval, and early modern Chinese. The Greeks, who were the first to explore geography as both art and science, achieved this through Cartography, Philosophy, and Literature, or through Mathematics. There is some debate about who was the first person to assert that the Earth is spherical in shape, with the credit going either to Parmenides or Pythagoras. Anaxagoras was able to demonstrate that the profile of the Earth was circular by explaining eclipses. However, he still believed that the Earth was a flat disk, as did many of his contemporaries. One of the first estimates of the radius of the Earth was made by Eratosthenes.

The first rigorous system of latitude and longitude lines is credited to Hipparchus. He employed a sexagesimal system that was derived from Babylonian mathematics. The meridians were sub-divided into 360°, with each degree further subdivided 60′ (minutes). To measure the longitude at different location on Earth, he suggested using eclipses to determine the relative difference in time. The extensive mapping by the Romans as they explored new lands would later provide a high level of information for Ptolemy to construct detailed atlases. He extended the work of Hipparchus, using a grid system on his maps and adopting a length of 56.5 miles for a degree.

From the 3rd century onwards, Chinese methods of geographical study and writing of geographical literature became much more complex than what was found in Europe at the time (until the 13th century). Chinese geographers such as Liu An, Pei Xiu, Jia Dan, Shen Kuo, Fan Chengda, Zhou Daguan, and Xu Xiake wrote important treatises, yet by the 17th century advanced ideas and methods of Western-style geography were adopted in China.

During the Middle Ages, the fall of the Roman empire led to a shift in the evolution of geography from Europe to the Islamic world. Muslim geographers such as Muhammad al-Idrisi produced detailed world maps (such as Tabula Rogeriana), while other geographers such as Yaqut al-Hamawi, Abu Rayhan Biruni, Ibn Battuta, and Ibn Khaldun provided detailed accounts of their journeys and the geography of the regions they visited. Turkish geographer, Mahmud al-Kashgari drew a world map on a linguistic basis, and later so did Piri Reis (Piri Reis map). Further, Islamic scholars translated and interpreted the earlier works of the Romans and the Greeks and established the House of Wisdom in Baghdad for this purpose. Abū Zayd al-Balkhī, originally from Balkh, founded the "Balkhī school" of terrestrial mapping in Baghdad. Suhrāb, a late tenth century Muslim geographer accompanied a book of geographical coordinates, with instructions for making a rectangular world map with equirectangular projection or cylindrical equidistant projection.

Abu Rayhan Biruni (976-1048) first described a polar equi-azimuthal equidistant projection of the celestial sphere. He was regarded as the most skilled when it came to mapping cities and measuring the distances between them, which he did for many cities in the Middle East and the Indian subcontinent. He often combined astronomical readings and mathematical equations, in order to develop methods of pin-pointing locations by recording degrees of latitude and longitude. He also developed similar techniques when it came to measuring the heights of mountains, depths of the valleys, and expanse of the horizon. He also discussed human geography and the planetary habitability of the Earth. He also calculated the latitude of Kath, Khwarezm, using the maximum altitude of the Sun, and solved a complex geodesic equation in order to accurately compute the Earth's circumference, which were close to modern values of the Earth's circumference. His estimate of 6,339.9 km for the Earth radius was only 16.8 km less than the modern value of 6,356.7 km. In contrast to his predecessors, who measured the Earth's circumference by sighting the Sun simultaneously from two different locations, al-Biruni developed a new method of using trigonometric calculations, based on the angle between a plain and mountain top, which yielded

more accurate measurements of the Earth's circumference, and made it possible for it to be measured by a single person from a single location.

The European Age of Discovery during the 16th and the 17th centuries, where many new lands were discovered and accounts by European explorers such as Christopher Columbus, Marco Polo, and James Cook revived a desire for both accurate geographic detail, and more solid theoretical foundations in Europe. The problem facing both explorers and geographers was finding the latitude and longitude of a geographic location. The problem of latitude was solved long ago but that of longitude remained; agreeing on what zero meridian should be was only part of the problem. It was left to John Harrison to solve it by inventing the chronometer H-4 in 1760, and later in 1884 for the International Meridian Conference to adopt by convention the Greenwich meridian as zero meridian.

The 18th and the 19th centuries were the times when geography became recognized as a discrete academic discipline, and became part of a typical university curriculum in Europe (especially Paris and Berlin). The development of many geographic societies also occurred during the 19th century, with the foundations of the Société de Géographie in 1821, the Royal Geographical Society in 1830, Russian Geographical Society in 1845, American Geographical Society in 1851, and the National Geographic Society in 1888. The influence of Immanuel Kant, Alexander von Humboldt, Carl Ritter, and Paul Vidal de la Blache can be seen as a major turning point in geography from a philosophy to an academic subject.

Over the past two centuries, the advancements in technology with computers have led to the development of geometrics. and new practices such as participant observation and geostatistics being incorporated into geography's portfolio of tools. In the West during the 20th century, the discipline of geography went through four major phases: environmental determinism, regional geography, the quantitative revolution, and critical geography. The strong interdisciplinary links between geography and the sciences of geology and botany, as well as economics, sociology and demographics have also grown greatly, especially as a result of Earth System Science that seeks to understand the world in a holistic view.

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1. **Instrument used for the measurement of wind speed is called:**
   (A) Altimeter (B) Barometer
   (C) Anemometer✓ (D) None of these
2. **Vernal equinox occurs on:**
   (A) December 21 (B) September 23
   (C) June 21 (D) None of these✓
3. **Atmospheric pressure at sea level is:**
   (A) 750 mm. (B) 760 mm.✓
   (C) 770 mm. (D) None of these
4. **When there is an active upward ascent of lighter warm air over the cold dense air, the front is called:**
   (A) Cold front (B) Warm front✓
   (C) Occuluded front (D) None of these
5. **On 21st of June, the Sun shines vertically on the:**
   (A) Tropic of Capricorn (B) Tropic of Cancer✓
   (C) Equator (D) Arctic Circle
6. **The hot molten material erupted from a volcano is called:**
   (A) Lava✓ (B) Magma
   (C) Pyro-clast (D) None of these
7. **The point in the Earth from where seismic waves spread out in all directions is:**
   (A) Seismic center (B) Epicenter
   (C) Earthquake Focus✓ (D) None of these
8. **The continental crust ranges from:**
   (A) 7 to 20 km in thickness (B) 20 to 70 km in thickness
   (C) 40 to 150 km in thickness (D) None of these✓
9. **Marble is a :**
   (A) Sedimentary rock (B)

(C) Metamorphic rock✓ (D) None of these

10. **Yardang is produced by:**
(A) River (B) Glacier
(C) Wind✓ (D) Volcanic activity

11. **Continental glacier produces the following feature on the Earth surface:**
(A) V-shaped valley (B) U-shaped valley
(C) Hanging valley (D) None of these✓

12. **The deepest point in the ocean bottom is in:**
(A) Indian ocean (B) Atlantic ocean
(C) Pacific ocean✓ (D) Arctic ocean

13. **The flat ocean bottom lying near the continents is called:**
(A) Peneplain (B) Archipelagic apron
(C) Lacustrine plain (D) None of these✓

14. **Benguela current flows near the western coast of:**
(A) Australia (B) South America
(C) Plain✓ (D) None of these

15. **Waves are caused by:**
(A) Gravitational force of moon (B) Gravit-ational force on Earth✓
(C) Sunrays (D) None of these

16. **Conical projection is best suited for:**
(A) Polar Regions (B) Equatorial Regions
(C) Temperate latitude✓ (D) None of these

17. **Zero degree meridian is:**
(A) 15° east of Prime Meridian (B) 10° east of Prime Meridian
(C) 5° west of Prime Meridian (D) None of these✓

18. **A map on RF 1:2400 will be:**
(A) A large-scale map (B) Small-scale map
(C) Medium-scale map✓ (D) None of these

19. **Lines showing place of equal rainfall are called:**
(A) Isohalines (B) Isobars
(C) Isopleths (D) None of these✓

20. **Sea water contains on the average about:**
(A) 3.5% Salt✓ (B) 2.7% Salt
(C) 7.1% Salt (D) None of these

21. **Lines of equal distribution of pressure are called:**
(A) Isopleths (B) Isotherms
(C) Isobars✓ (D) None of these

22. **According to Ferret's Law, winds are deflected:**
(A) To their right in the northern hemisphere✓ (B) To their left in northern hemis-phere
(C) Not deflected at all (D) None of these

23. **Thermal equator is located:**
(A) At the equator (B) North of equator✓
(C) South equator (D) None of these

24. **Orographic rainfall is affected by:**
(A) Relief features✓ (B) Distance from the sea
(C) Distance from the equator (D) None of these

25. **Line graphs are used for depicting:**
(A) Temperature of place✓ (B) Rainfall of a place
(C) Growth of population (D) None of these

26. **Meanders are created by:**
(A) River action✓ (B) Action of wind
(C) Action of glacier (D) None of these

27. **Equatorial climate has:**
(A) No dry season✓ (B) Short dry season
(C) Long dry season (D) None of these

28. **Oxygen in the atmosphere is:**
(A) 78% (B) 71%✓
(C) 59% (D) None of these

29. **Density of sea water ranges from:**
(A) 1.027 to 1.028✓ (B) 1.010 to 1.025
(C) 1.000 to 1.020 (D) None of these

30. **West-wind drift is a:**
(A) Circumpolar drift✓ (B) Current of South Pacific Ocean
(C) Current of South Atlantic Ocean (D) None of these

31. **Limestone is a:**
(A) Meta-morphic rock (B) Sedime-ntary rock✓
(C) Igneous rock (D) None of these

32. **The material thrown out during an eruption is:**
(A) Solid (B) Liquid✓
(C) Gaseous (D) None of these

33. **The cold air mass is:**
(A) Conditionally unstable✓ (B) Stable
(C) Unstable (D) None of these

34. **Weathering is caused by:**
(A) Great range of temperature✓ (B) Great range of rainfall
(C) Action of wind (D) None of these

35. **Simple conical projections with one standard parallel are used for:**
(A) Maps for higher latitudes (B) Maps for the polar regions
(C) Maps for the lower latitudes (D) None of these✓

36. Tornadoes affect areas ranging from:
(A) A few yards to a quarter of a mile in diameter (B) A few furlongs to about 5 miles in diameter
(C) A few mile to about 10 miles in diameter✓ (D) None of these

37. On a weather map the word 'L':
(A) Denotes a low pressure zone✓ (B) Denotes a low temperature zone
(C) Denotes a low rainfall zone (D) None of these

38. Large-scale maps are used for:
(A) Small areas✓ (B) Large areas
(C) Areas of moderate extent (D) None of these

39. In a wave water particles move only:
(A) Near the coast (B) In deep water
(C) In shallow water **(D) None of these✓**

40. The inner core of the Earth is:
(A) Solid✓ (B) Liquid
(C) Semi-solid (D) None of these

41. Weather describes the condition of .... at any one time.
(A) The Earth (B) The land surface
(C) The atmosphere✓ (D) The Ionos-phere
(e) Space *(f)* None of these

42. Seasonally increases with:
(A) Latitude✓ (B) Distance from sea
(C) Altitude (D) Aspect
(e) Longitude *(f)* None of these

43. The temperature decreases with increasingly altitude by 1°C for every .... rise.
(A) 100 ft (B) 150 m
(C) 165 m✓ (D) 250 m
(e) 300 m *(f)* None of these

44. Water vapour turns into clouds in the atmosphere when:
(A) It rains (B) The temperature rises
(C) Dew point is reached✓ (D) Evaporation takes place
(e) Relative humidity *(f)* None of these

45. Up-draught and down-draught in a cumulo-nimbus cloud lead to the formation of:
(A) Lightening (B) Hail
(C) Thunder✓ (D) Snow
(e) Any other

46. The air in the middle of a typhoon is:
(A) Rising✓ (B) Descending
(C) Blowing in a clockwise spiral (D) Gusty and variable
(e) None of these

47. Oceanic plates are made up of .... rocks.
(A) Basaltic✓ (B) Granite
(C) Acidic (D) Mantle

48. Which of the following statement is NOT true:
(A) The core is made chiefly of nickel and iron (B) There is an outer (liquid) and inner (solid) core
(C) The mantle is made of liquid ultra boric rocks (D) The crust, or lithosphere, is made of rigid crystal plates
***(e)* Earthquake waves pass through the core but not through the mantle✓**

49. Young fold mountains are found where crystal plates:
(A) Diverge **(B) Collide✓**
(C) Are newly formed (D) Are thinnest
(e) None of these

50. The retreat of the waterfall up stream results in:
(A) Potholes (B) Rapids
(C) Bluffs (D) Floodplain
***(e)* Gorge✓** *(f)* None of these

51. Which type of erosion is not typical of a desert?
(A) Abrasion **(B) Plucking✓**
(C) Attrition (D) Deflation
(e) None of these

52. A glacier lengthens when:
(A) The climate gets warmer (B) The climate gets drier
(C) The rate of accu-mulation of ice exceeds the rate of melting✓ (D) The gradient of the glacier valley steepens
(e) There is a state of equilibrium between snowfall and the rate of melting *(f)* None of these

53. On earth surface, water cover is:
(A) 50% (B) 60%
(C) 70%✓ (D) 80%
(e) None of these

54. Continental shelf is:
(A) A link between ocean and land✓ (B) A broad level plain forming greater part of the ocean
(C) The deepest part of the ocean (D) A steep slope stretching to the sea plain
(e) None of these

55. The strength of wave action depends on all

these except:
(A) **Currents in the set✓** (B) Wind strength
(C) Length of fetch (D) Depth of coastal water
(e) Height of waves *(f)* None of these

56. The sea-water on the average contains:
(A) **3.5% salt✓** (B) 5% salt
(C) 10% salt (D) 2.5% salt
(e) 4.5% salt *(f)* None of these

57. Neap tides occur ....
(A) At the full and new quarter moon days (B) **When the Sun, Moon and Earth are in one straight line✓**
(C) (D)

58. Best suited projection for Pakistan is ....
(A) Conical (B) Zenithal
(C) Mercator (D) Cylin-drical equal area
(e) **Conven-tional✓** *(f)* None of these

59. A portable measure for pressure is ....
(A) A Stevenson screen (B) An anemometer
(C) **An aneroid baro-meter✓** (D) A maximum and minimum therm-ometer set
(e) A mercury column

60. Small-scale maps are used for:
(A) Small areas (B) Areas of moderate extent
(C) **Large areas✓** (D) None of these

61. Calcareous rocks are .... rocks.
(A) **Sedimentary✓** (B) Igneous
(C) Metamorphic (D) None of these

62. Most of the rainfall received in Pakistan by ....
(A) Westerlies (B) Mountain and valley winds
(C) **Monsoon Winds✓** (D) None of these

63. Organic deposits are mostly found over ....
(A) Continent shelf (B) Continent Slope
(C) **Deep Sea plain✓** (D) None of these

64. Irrigation is a .... feature.
(A) Cultural (B) Natural
(C) **Topographic✓** (D) None of these

65. Standard parallel is a part of .... projection.
(A) Cylindrical (B) **Conical✓**
(C) Zenithal (D) None of these

66. Projections are called:
(A) Mathematical (B) Conical
(C) **Zenithal✓** (D) None of these

67. Conical projections are suitable for ....
(A) Tropical (B) **Temperate✓**
(C) Polar areas (D) None of these

68. .... is the best method of drawing distribution maps.
(A) **Dot method✓** (B) Shade method
(C) Diagrammatic method (D) None of these

69. A low pressure areas is called:
(A) **Cyclone✓** (B) Anti-cyclone
(C) Wedge (D) None of these

70. Zenithal projections are mostly used for .... areas.
(A) Equatorial (B) Tropical
(C) **Polar✓** (D) None of these

71. The feature not due to glaciation is a:
(A) **Wadi✓** (B) Cirque
(C) Fiord (D) None of these

72. Loess found in Northern China is:
(A) Mountain Screes (B) Volcanic ash
(C) **River debris✓** (D) None of these

73. An example of an igneous rock is:
(A) Clay (B) Sand
(C) **Granite✓** (D) Slate

74. The moraine which is formed where two small glaciers coverage is termed:
(A) Lateral (B) Ground
(C) Terminal (D) **Medial✓**

75. Stacks are typical features of:
(A) Coastal glaciations in temperate latitudes (B) **Marine erosion by waves✓**
(C) Coastal deposition (D) Materials at river delta

76. The usual way of showing population in a map by using:
(A) Lines (B) Squares
(C) **Dots✓** (D) None of these

77. If the R.E. of a map is 1:25000, this is a:
(A) **One inch map✓** (B) Two inch map
(C) Two and a half inch map (D) Five inch map

78. North-west passage is suitably shown in:
(A) **Zenithal Projection✓** (B) Conical Projection
(C) Cylindrical Projection (D) None of these

79. West Wind Drift is present in all oceans except:
(A) **Arctic✓** (B) Indian
(C) Pacific (D) Atlantic

80. The predominant vegetation of Arid Western U.S.A is:
(A) Coniferous (B) Deciduous

(C) Grasses (D) Xero-phytes✓

81. Hot wind which blows from Sahara to the Guinea Coast is the:
(A) Sirocco (B) Mistral
(C) Harmattan✓ (D) Ephn

82. Warm current that keeps the Norwegian ports ice-free throughout the year is the:
(A) Canary current (B) Arctic current
(C) Guinea current (D) North Atlantic current✓

83. Elongated lakes have normally resulted from:
(A) Glacial erosion (B) Volcanic eruption
(C) Faulting✓ (D) Corals

84. The inlets in the coast of South Western New Zealand are called:
(A) Rias (B) Fjords
(C) Esturies (D) Spits✓

85. One of the following is also called international scale:
(A) Linear (B) Diagonal
(C) Comparative (D) R.E.✓

86. Rejuvenation of river is associated with formation of:
(A) Oxbow lakes (B) Basins✓
(C) Monadnocks (D) Terraces

87. Radial Trellised and Denritic are forms and patterns of:
(A) Mountain systems (B) Drainages
(C) Climates (D) None of these✓

88. Ring of fire is attributed to:
(A) Antarctic (B) Arctic
(C) Atlantic✓ (D) None of these

89. Earthquake of Kobe, Japan in January 1995 had a magnitude:
(A) 5.2 (B) 6.2
(C) 7.2 (D) 6.6
(e) 6.9✓

90. Charles Richter of the California Institute of Technology developed the Richter scale in:
(A) 1735 (B) 1835
(C) 1855 (D) 1935✓

91. Marble and Hornfelses are produced as result of:
(A) Contact metam-orphism (B) Regional meta-morphism
(C) Dynamic meta-morphism (D) None of these✓

92. The Karakatuo volcano is situated in:
(A) South West Africa (B) Central America
(C) South East Asia✓ (D) None of these

93. Atlantic Ocean occupies .... percent of aquatic surface of the world ocean.
(A) 46% (B) 52%
(C) 38% (D) None of these✓

94. Notable river with estuary is:
(A) Volga (B) Indus
(C) Amazon✓ (D) None of these

95. Conditions most favourable to solifluction are found in:
(A) Deserts (B) Equatorial region
(C) Permafrost region✓ (D) None of these

96. Fossils make it possible:
(A) To subdivide deposits by age✓ (B) To identify drainage system
(C) To locate snowline (D) None of these

97. Trades are caused by:
(A) Distribution of land and sea (B) Shape of Earth
(C) Pressure differential between equatorial and sub-tropic belts✓ (D) None of these

98. Tombolo spit connects:
(A) Ref with Island (B) Island with Headland✓
(C) Lagoon with Cliff (D) None of these

99. Karst region is originally a landscape located at:
(A) Belgium (B) Greece
(C) Former Yugoslavia✓ (D) None of these

100. At present time, volcanoes are chiefly found along:
(A) Circum-Pacific belt✓ (B) Appal-achian region
(C) Karakoram - Kunlun Chain (D) None of these

Basic Mathematics:

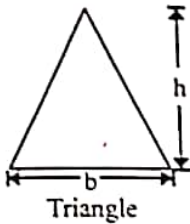
Symbols and Abbreviations

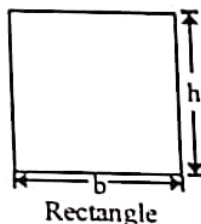
=	is (equal to)	~	is similar to
<	is less than	π	Pi
>	is greater than	⊥	is perpendicular to
≠	is not equal to	||	is parallel to
≥	Greater than or equal to	°	degree
≤	less than or equal to	|n|	absolute value
≮	is not less than	$\overline{AB}$	line segment
≯	is not greater than	∠A	angle
≰	neither less than nor equal to	ΔABC	triangle ABC
≱	neither greater than nor equal to	⇒	this implies that
∵	because	∴	therefore

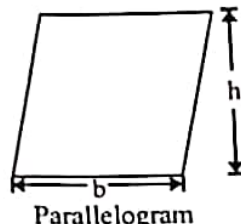
Common Unit Conversions

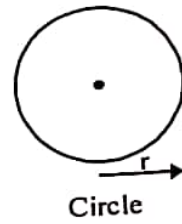
LINEAR MEASURE		WEIGHT	
English System	Metric System	English System	Metric System
1 inch	= 2.54	1 lb	= 454 g
1 foot	= 30.48 centimeters	2.2 lb	= 1 kg
1 yard	= 0.9144 meter	1 grain	= 0.064799 gram
0.3937 inch	= 1 centimeter	15.432 grains	= 1 gram
1.0936 yards	= 1 meter	1 short ton	= 907.18 kg
0.62137 mile	= 1 kilometer	1 long ton	= 1016 kg

SQUARE MEASURE		LIQUID MEASURE	
English System	Metric System	English System	Metric System
1 square inch	≈ 6.4516 square cm	1 fluid ounce	= 0.94635 liter
1 square foot	= 0.092903 sq. meter	1 gallon	= 3.7854 liters
1 square yard	= 0.83613 sq. meter	0.26417 gallon	= 1 liter
1.960 square	= 1 square meter yard	1.0567 quartz	= 1 liter
0.38608 square	= 1 square kilometer mile	33.814 fluid	= 1 liter ounces

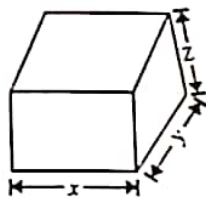
Geometric Figures

Triangle

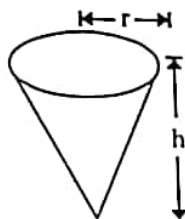
Area $= \frac{1}{2} b \times h$

Rectangle

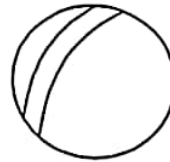
Area $= b \times h$

Parallelogram

Area $= b \times h$

Circle

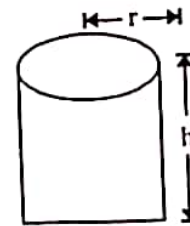
Circumference $2\pi r$

Area $= \pi r^2$

Rectangular Bax

Volume = xyz

Cone

Volume $= \frac{1}{3}\pi r^2 h$

Ball

Volume $= \frac{4}{3}\pi r^3$

Surface Area $= 4\pi r^2$

Cylinder

Volume $= \pi r^2 h$

Important Formulas at A Glance

L.C.M AND H.C.F

Prime Number : A number greater than whose only factors are 1 and the number itself.

L.C.M : The LCM of two or more given number is the least number which is exactly divisible by each of them.

H.C.F : The highest number which will divide into each of the given numbers.

H.C.F of vulgar fractions : The HCF of two or more fractions is the highest fraction which is exactly divisible by each of the fractions

$$\text{H.C.F} = \frac{\text{HCF of numerators}}{\text{LCM of denominator}}$$

PERCENTAGE

Percentage: A fraction whose denominator is 100 is called a percentage.

Percent Change: The full formula for percent change is:

$$\text{Percent Change} = \frac{\text{(New Amount)} - \text{(Original Amount)}}{\text{(Original Amount)}} \times 100$$

Note 1: When the new amount is less than the original amount then the result will be percent decease.

Note 2: When the new amount is greater than the original amount than the result will be percent increase.

Note 3: If A is x% of C and B is y% of C, then A is $\frac{x}{y} \times 100\%$ of B.

Note 4: If the value is increase successively by x% and y% then the final increase is given by $\left[x + y + \frac{xy}{100}\right]\%$

PROFIT AND LOSS

1. Profit = Selling Price (SP) – Cost Price (CP)
2. Loss = Cost Price (CP) – Selling Price (SP)
3. Gain or Loss percent = $\frac{\text{Loss or Gain}}{\text{CP}} \times 100$
4. If a man purchases a certain number of articles at p a rupee and the same number at q a rupee. He mixes them together and sells them at r a rupee. This his profit or loss in percent

$$= \left[\frac{2pq}{r(p+q)} - 1\right] \times 100$$

according to the sign +ve or –ve

5. If a man marks his goods at p% above his cost price and allows purchasers a discount of q% for cash h then

$$\text{Profit or loss in percent} = \left[p - q - \frac{pq}{100}\right]$$

RATIO AND PROPORTION

Ratio: The number of times one quantity contains another quantity of the same kind is called the ratio of the two quantities.

Note 1: The first term of a ratio is called the antecedent and the second the consequent.

Compound Ratio: Ratios are compounded by multiplying together the antecedents for a new antecedent, and the consequents for a new consequent.

Note 1: If four quantities be in proportion, the product of the extremes is equal to the product of the means.

Note 2: If the sum of two numbers is A and their difference is d, then the ratio of the number is given by

$$A + d : A - d$$

Rule: A number which when subtracted from the terms of the ratio a : b makes it equal to the ratio p : q is $\frac{bp - aq}{p - q}$

Rule: A number which when added to the term of the ratio a : b makes it equal to the ratio p : q is $\frac{aq - bp}{p - q}$

AREA AND VOLUME

Area of Triangle: If all the sides of a triangle are increased by x%, then the area increased by $\frac{x(x+200)}{100}\%$.

Area of Rectangle: If sides of a rectangle are increased by $x\%$ then as for triangle its area is increased by $\frac{x(x+200)}{100}\%$.

Note 1: If the sides of triangle, square, rhombus, circle, rectangle is increased by $x\%$, its area is increased by $\frac{x(x+200)}{100}\%$.

Note 2: In measuring the sides of rectangle one side is taken a% in excess and the other b% in deficit. The error percent in area calculated from the measurement is $a - b - \frac{ab}{100}$ in excess or deficit according to the +ve or −ve sign.

****

1. Simplify:
   $(165)^2 - (164)^2$
   (A) 204 (B) 1
   (C) 2 (D) 116
   (E) 329✓
2. A student gets 75, 82 and 86 marks in an examination. How many marks he should get so that average becomes 85?
   (A) 90 (B) 87
   (C) 97✓ (D) 99
3. Which number can replace both the questions marks?
   (A) 5 (B) 10✓
   (C) 25 (D) 100
4. A doll is sold for Rs. 220.00. What was the cost of doll if rate of profit was 10% of the cost?
   (A) Rs. 198.00✓ (B) Rs. 200.00
   (C) Rs. 210.00 (D) Rs. 240.00
5. Find the arithmetic mean between 4 and 6.
   (A) 1 (B) 2
   (C) 5✓ (D) 3
6. Find the missing number.
   3, 5, 9 and 17.....
   (A) 32 (B) 33✓
   (C) 34 (D) None
7. Think a number, double it, add 7 and then multiply it by 4 and then divide it by 6, if the answer is 10, what is the number?
   (A) 2 (B) 3
   (C) 4✓ (D) 6
8. If 7 men in 100 are criminals, how many men in 500 are not criminals?
   (A) 435 (B) 465✓
   (C) 455 (D) 35
9. In a box of 48 apples, 8 out of each dozen are good. How many in the box are bad?
   (A) 8 (B) 16✓
   (C) 12 (D) 19
10. A father is three times as old as his son. In 10 years, he will twice as old as his son. How old is the father at present?
    (A) 30 years✓ (B) 25 years
    (C) 20 years (D) None
11. A man starts climbing a hill. Every minute he ascends 20 meters but slips down 5 meters. How long will he take to ascend a point 80 meters high?
    (A) 5 minute✓ (B) 5.20 sec.
    (C) 4.80 sec. (D) None
12. How many hours will it take a jet plane to travel 400 km at a speed of 600 km per hour?
    (A) 2 hours (B) 2/3 hours✓
    (C) 3/2 hours (D) 1/3 hours
13. $x + x + x = ?$
    (A) $3x$✓ (B) x^3
    (C) $3x^3$ (D) $x^2 + x$
14. If $2^x = 32$ then $x = ?$
    (A) 5✓ (B) 6
    (C) 4 (D) 16
15. $\sqrt{256}$:
    (A) 17 (B) 14
    (C) 16✓ (D) 128
16. $x + 6 = 7$, then $x = ?$
    (A) 3 (B) 1✓
    (C) $\frac{7}{6}$ (D) 13 x

17. 1 metre is equal to:
(A) 10^2 mm (B) 10^3 mm✓
(C) 10^4 mm (D) 10^5 mm

18. $2^3 \times 5^0$ =:
(A) 30 (B) 40
(C) 8✓ (D) 6

19. 144 ÷ 12:
(A) 13 (B) 12✓
(C) 14 (D) 22

20. Find the missing letter:
3 5 7 ...... 13 17
(A) 8 (B) 9
(C) 11✓ (D) 12

21. Provide the missing number:
8 4 32 7 5 ....
(A) 33 (B) 11
(C) 17 (D) 35✓

22. Who developed algebra?
(A) Muhammad ibn Musa Khawarizmi✓
(B) Ibn Sina
(C) Euclid
(D) Jabir ibn Hayyan

23. The fraction 101 in decimal form is:
(A) 101.00027✓ (B) 101.0027
(C) 101.027

24. When 36 is written is simplest fractional form, the sum of numerator is:
(A) 10✓ (B) 34
(C) 20 (D) None

25. What is the difference between the biggest and the smallest fraction is:
(A) $\frac{1}{6}$✓ (B) $\frac{1}{12}$
(C) $\frac{1}{20}$

26. Which of the following fractions is the smallest?
(A) $\frac{13}{16}$ (B) $\frac{15}{19}$✓
(C) $\frac{17}{21}$

27. 12. 1212 + 17.0005 − 9.1102 =?
(A) 20.15 (B) 20.0105
(C) 20.0015 (D) -8.3972092✓

28. 892.7- 573.07 − 95.007 =?
(A) 224.623✓ (B) 224.777
(C) 233.523

29. 0.002 × 0.5 =?
(A) 0.0001 (B) 0.001✓
(C) 0.01

30. 16.02 × 0.001=?
(A) 0.001602 (B) 0.01602✓
(C) 0.1602

31. $\left[.00625 \text{ of } \frac{23}{5}\right]$ when expressed as a fraction, equals:
(A) $\frac{23}{80}$ (B) $\frac{23}{800}$✓
(C) $\frac{23}{8000}$

32. 0.213 ÷ 0.00213 =?
(A) 1 (B) 10
(C) 100✓

33. 4.036 divided by 0.04 gives:
(A) 1.009 (B) 10 09
(C) 100.0 (D) 100.9✓

34. It 10 men can complete a work in 20 days, how long will it take 8 men to do the job if they work at the same rate?
(A) 14 days (B) 18 days
(C) 25 days✓

35. In a class of 550 students, 42% wish to go to college. How many students wish to attend the college?
(A) 210 (B) 220
(C) 231✓

36. 0.03 × 10=?
(A) 30 (B) 3
(C) 0.3✓

37. When you divide 0.7 by 10, you will get:
(A) 7 (B) 0.07✓
(C) 70 (D) 0.007

38. If all the members of a team are juniors or seniors and if the ratio of juniors to seniors on the team is 3:5, what percent of team members are seniors?
(A) 37.5% (B) 40%
(C) 60% (D) 62.5%✓

39. Scot can read 50 pages per hour. At this rate, how many pages can he read in 50 minutes?
(A) 25 (B) 41✓
(C) 48 (D) 60

40. If 80% of the applications to a program were rejected, what is the ratio of the number accepted to the number rejected?
(A) $\frac{1}{5}$✓ (B) $\frac{1}{4}$
(C) $\frac{2}{5}$ (D) $\frac{4}{5}$

41. The measures of the three angles in a triangle are in the ratio of 1 : 1 : 2. Which of the following must be true?
I The triangle is isosceles
II The triangle is a right triangle
III The triangle is equilateral
(A) None (B) I only

(C) II only (D) I and II only✓

42. What is the ratio of the circumference of a circle to its radius?
(A) 1 (B) $\frac{\Pi}{5}$
(C) Π (D) 2Π✓

43. A man standing at a distance of 1 metre from a mirror wishes to take the photograph of his image in the mirror. At what distance should he place his camera from the mirror?
(A) ½ a metre (B) 1 metre✓
(C) 2 metres (D) 4 metres

44. Alia bought a jewellery set for Rs 84,000/- and sold for 85,500/- Find the percentage of profit.
(A) 1.79%✓ (B) 1.80%
(C) 1.81% (D) 1.82%

45. A symbol having a fixed numerical value is called:
(A) Variable (B) Literals
(C) Constant✓ (D) Binomial

46. Haris bought 10 ice creams. He gave Rs. 1000 to the shopkeeper. The shopkeeper returned him Rs 250. For how much did he buy one ice cream?
(A) 50 (B) 75✓
(C) 100 (D) 150

47. The price of a pen is Rs 42 and of the note book is Rs 18. Calculate how many pens and notebooks you can buy for Rs 480 in equal quantity?
(A) 8,8✓ (B) 7,7
(C) 6.6 (D) 9,9

48. After 32 years from now, a boy will be five times as old as he was 8 years back. How old the boy is now?
(A) 20 Years (B) 19 Years
(C) 18 Years (D) 17 Years

49. Distribute an amount of 200 between Rehman & Usman such that Rehman gets Rs 50 more than twice as much as Usman gets. How much Rehman will get?
(A) 50 (B) 150
(C) 175✓ (D) 185

50. A linear equation consists of polynomials of degree______
(A) One✓ (B) Two
(C) Three (D) Four

51. 99 × 4 = __________
(A) 392 (B) 396✓
(C) 394 (D) 390

52. 40 × 5.9 = __________
(A) 239 (B) 237
(C) 278 (D) 236✓

53. 1140 ÷ 40 = __________
(A) 28.5✓ (B) 21.5
(C) 27.5 (D) 25.5

54. 300 ÷ 1.5 = __________
(A) 400 (B) 200✓
(C) 300 (D) 100

55. Which number can replace both the question marks? 2/? = ?/50 .
(A) 100 (B) 10✓
(C) 25 (D) 5

56. Complete the series: 6,9,13,16,20,23 __________
(A) 27,31 (B) 26,31
(C) 27,30✓ (D) 26,30

57. If you write down all the numbers from 1 - 100, how many times would you write 3?
(A) 21 (B) 19✓
(C) 20 (D) 18

58. Ali ran around a 1/4 kilometer jogging track 17 times. How many kilometers did he run?
(A) 4 ¾ % km (B) 4 ½ km
(C) 4 ¼ % km✓ (D) 4 km

59. Complete the series:
64, 48, 40, 36, 34, __________
(A) 33✓ (B) 31
(C) 32 (D) 30

60. A man buys a toy for Rs. 70 after getting a discount of 20%. What was the marked price of the toy?
(A) Rs. 90 (B) Rs 56
(C) Rs. 87.50✓ (D) Rs. 84

61. A history class has 12 boys and 18 girls. Boys are what fraction of the class?
(A) 2/5 (B) 2/3✓
(C) ¾ (D) 3/5

62. 25 students took a test and 4 of them failed. What per cent of them passed the test?
(A) 84%✓ (B) 80%
(C) 82% (D) 75%

63. 3/1000 written as a fraction is?
(A) 0.003✓ (B) 0.3
(C) 0.03 (D) 3

64. 18 is 75% of __________.
(A) 32 (B) 25
(C) 34 (D) 24✓

65. In a class of 550 students, 42% wish to go to college. How many wish to attend college?
(A) 252 (B) 210
(C) 231✓ (D) 200

66. When you divide 0.7 by 10, you get:
(A) 0.007 (B) 0.07✓
(C) 70 (D) 7

67. A toy is sold for Rs. 220, what was the cost if the rate of profit was 10% of the cost?
(A) Rs. 210 (B) Rs. 198

(C) Rs. 200✓ (D) Rs. 196

68. If ten men can do a piece of work in twenty days, how long will it take 8 men to do the job if they work at the same rate?
(A) 28 days (B) 22 days
(C) 25 days✓ (D) 21 days

69. A bag contains 9 KG of sugar which is separated into packages containing 450 grams each. How many such packages can be made?
(A) 24 (B) 18
(C) 20✓ (D) 16

70. $2\frac{2}{3} \times \frac{5}{14} = ?$
(A) $\frac{40}{24}$ (B) $\frac{20}{22}$✓ (C) $\frac{50}{42}$ (D) $\frac{21}{20}$

71. One billion is equal to:
(A) 100 Thousands✓(B) 100 Crores
(C) 100 Millions (D) 100 Lacs

72. When you divide 0.7 by 10, you will get:
(A) 0.007 (B) 0.07✓
(C) 70 (D) 7

73. 0.03 × 10 = ?
(A) 0.003 (B) 3
(C) 0.3✓ (D) 30

74. If 10 men can complete a work in 20 days, how long will it take 8 men to do the job if they work at the same rate?
(A) 25 days✓ (B) 18 days
(C) 20 days (D) 16 days

75. Multiply 2438.244 × by 10.
(A) 24382.44✓ (B) 24328.44
(C) 24384.42 (D) 24384.44

76. A doll is sold for Rs. 220.00. What was the cost of doll if rate of profit was 10% of the cost?
(A) Rs. 240.00 (B) Rs. 200.00✓
(C) Rs. 210.00 (D) Rs. 198.00

77. 358.0074 × 100 = ?
(A) 35800.47 (B) 35800.74✓
(C) 38500.47 (D) 35800.00

78. Akbar bought a sweater for Rs.200 and sold it Rs.250. How much profit did Akbar get?
(A) Rs.50✓ (B) Rs.20
(C) Rs.80 (D) Rs.40

79. The number, whose 20% is 100, is:
(A) 700 (B) 500✓
(C) 600 (D) 400

80. Salaam bought a pair of shoes for Rs.300 and sold it at Rs.370. How much profit did Salaam get?
(A) Rs.20 (B) Rs.70✓
(C) Rs.75 (D) Rs.80

81. If 80 men dug 4 holes in 12 months, how many men would be required to dig 6 holes in 4 months?
(A) 40 men (B) 410 men
(C) 360 men✓ (D) 140 men

82. If 15 men can do a piece of work in 8 days, how many men will finish it in 10 days?
(A) 8 (B) 12✓
(C) 16 (D) 14

83. If 3 men and 6 boys can do a work in 20 days, then 6 men and 8 boys shall take:
(A) 20 days (B) 8 days
(C) 9 days (D) 6 days✓

84. The number, whose 25% is 150, is:
(A) 900 (B) 700
(C) 800 (D) 600✓

85. If 20 men can do a piece of work in 8 days, how many men will finish it in 10 days?
(A) 18 men (B) 16 men✓
(C) 8 men (D) 4 men

86. Akbar sold his old gun for Rs.900, which he bought for Rs.2500. What is his % loss?
(A) 15% (B) 82%
(C) 94% (D) 64%✓

87. This road is only 50 km long. We covered a distance of 20 km. What percentage of distance have we covered?
(A) 53% (B) 69%
(C) 48% (D) 40%✓

88. Nasir bought a practical copy for Rs.60 and sold it at Rs.40. How much loss did he get?
(A) Rs.20✓ (B) Rs.60
(C) Rs.40 (D) Rs.600

89. The number, whose 17% is 51, is:
(A) 210 (B) 100
(C) 300✓ (D) 200

90. Insert the missing number:
341 (250) 466 282 ( ) 398
(A) 240 (B) 232✓
(C) 226 (D) 228

91. 20 men can construct a building in 40 days. How long will it take 10 men to do this work?
(A) 80 days✓ (B) 60 days
(C) 70 days (D) 50 days

92. Muhammad Aslam bought a TV for Rs.8000 and sold it at Rs.7000. How much loss did he get?
(A) Rs.4000 (B) Rs.2000
(C) Rs.3000 (D) Rs.1000✓

English

FILL IN THE BLANKS WITH SUITABLE PREPOSITION

1. Man is still a _____ in the labour market.
   (A) glut (B) possibility
   (C) commodity✓ (D) provision
2. Only a team work in the country can _____ a change in the existing circumstances.
   (A) Hang about
   (B) Bring about✓
   (C) Back out of
   (D) Carried away by
3. I think is used to be a good school but it has been_____ for twenty years or so.
   (A) Look to one's laurels (to be contented on past achievements)
   (B) Play fast and loose
   (C) Rest on one's laurels✓
   (D) A fool's paradise
4. He is looking for someone to offer her glamorous well paid and undemanding job, but I think he is_____
   (A) A happy medium
   (B) Cry for the moon (to want or ask something which is impossible to get)✓
   (C) Happy go lucky
   (D) Hard boiled
5. he says he will get a well-paid job but I think it is just_____
   (A) A happy medium
   (B) A lame duck
   (C) Pie in the sky (something good promised in future but one is not likely to get)✓
   (D) Cheek by jowl
6. The factory workers' decision to strike was_____ for factory owners.
   (A) A smash hit
   (B) A smack in the eye (an insult or rebuff)✓
   (C) Cut down to size
   (D) Pie in the sky
7. In their search for artifacts, archaeologists are often ________ not because a suspected site is remote and isolated but because it is:
   (A) Misled, verified
   (B) Undeterred, unearthed
   (C) Venerated, sacred
   (D) Frustrated, urbanized✓
8. Advertising alone no matter how _______ cannot convince people to _______ an item that answers no real and vital need.
   (A) Stringent, ignore
   (B) Outrageous, disregard
   (C) Innocuous, modify
   (D) Extensive, purchase✓
9. Working under the pressure of time, Raza did not notice his _________ mistake.
   (A) Leisurely, stupid
   (B) Rapidly, carelessly✓
   (C) Frantically, inevitable
   (D) Continually, redundant (excessive)
10. Even _______ pleasure may leave _______ memories.
    (A) Ephemeral, lasting✓
    (B) Emphatic, stalwart
    (C) Transitory, fleeting
    (D) Enigmatic, (puzzling mysterious)
11. Anyone familiar with the facts could ________ his arguments, which seemed logical but were actually:
    (A) Refute, specious✓
    (B) Support, protracted
    (C) Repeat, recumbent (lying down)
    (D) Review, cogent
12. By next July, I _____ in this office for ten years.
    (A) will work (B) worked
    (C) shall be worked
    (D) shall have been working✓
13. She_____ of marrying Saleem when she discovered he was already married.
    (A) had thought
    (B) was thinking✓
    (C) was being thought
    (D) thought
14. I don't like milk, so I ____ tea for breakfast.
    (A) generally take✓
    (B) am generally taking
    (C) was generally taking
    (D) had generally taken
15. Where ______ next Sunday? Perhaps I may be visiting you.
    (A) do you spend✓
    (B) did you spend
    (C) will you have spent
    (D) you spend
16. If I ______ you, I would not lose temper.
    (A) was **(B) were✓**
    (C) had been (D) would be

17. I ______ Yasser since Monday.
(A) **Have not seeing✓**
(B) Did not see
(C) Was not seeing

18. We ______ for a picnic last week.
(A) **Went✓** (B) Have gone
(C) Had gone (D) Will go

19. When he last wrote to me, he ______ in Lahore.[1]
(A) **Had lived✓** (B) Lived
(C) Was living
(D) Has been living

20. I wondered why I ______ of it before.
(A) Did not think
(B) Have not thought
(C) **Had not thought✓**
(D) Would not think

21. She ______ a bath when the telephone bell rang.
(A) Took (B) **Had taken✓**
(C) Had been taking
(D) Was taking

22. I ______ if I were you.
(A) Shall apologise
(B) Apologise
(C) **Should apologise✓**
(D) Was apologising

23. The contractor insisted that he ______ the work before the end of March.
(A) Will complete
(B) **Would complete✓**
(C) Was completing
(D) Will be completing

24. We ______ to go to a movie next week, but we find we can't go as we have already spent all the money we had.
(A) Plan (B) Will plan
(C) Are planning
(D) **Were planning✓**

25. It ______ if the temperature had fallen any more.
(A) Would snow
(B) Would have been snowed
(C) **Would have snowed✓**
(D) Would have been snowing

26. I can never forget what I ______.
(A) Just read
(B) **Have just read✓**
(C) Will read (D) Will just read

[1] When two actions done in the past sentence one action consists of past indifinite and 2nd action comprising past perfect tense.

27. He invited ______ to the feast to celebrate the success of his son.
(A) **All and sundry✓**
(B) Above board
(C) All in all
(D) Alpha and omega

28. The ______ of his speech was that Islam is a religion of peace.
(A) **Alpha and omega✓**
(B) Apple pie order
(C) Are and part
(D) Burning question

29. She is a good house wife and keeps the house in______.
(A) **Apple pie order✓**
(B) An augean sable
(C) Left handed complement
(D) Lacklustre

30. The principal's remarks ______. The students flew into fury and decided to go on strike.
(A) Have one's name on
(B) Get the better of him
(C) Bring the person to knee
(D) **Add fuel to fire✓**

FILL IN THE CORRECT PHRASES

1. By next July, I ______ in this office for ten years.
(A) Will work (B) Worked
(C) Shall be worked
(D) **Shall have been working✓**

2. She ______ of marrying Ali when she discovered Ahmed was already married.
(A) Had thought
(B) **Was thinking✓**
(C) Was being thought
(D) Though

3. I don't like milk, so I ______ tea for breakfast.
(A) **Generally drink✓**
(B) Am generally drinking
(C) Was generally drinking
(D) Had generally drunk

4. Where ______ next Sunday? Perhaps I may be visiting you.
(A) **Do you spend✓**
(B) Did you spend
(C) Will you have spent
(D) You spend

5. If I ___ you, I would not lose temper.

(A) Was (B) Were✓
(C) Had been (D) Would be

6. **She would not have borrowed the diamond necklace if she ___ wiser.**
(A) Was (B) Were
(C) Had been✓
(D) Could have been

7. **We asked the guests what places they ___ the next day.**
(A) Would visit✓ (B) Were visiting
(C) Will visit (D) Had visited

8. **If you went away now, we ___ you.**
(A) Missed (B) Will miss
(C) Would miss✓
(D) Would have missed

9. **I don't think I ___ him yet.**
(A) Have been meeting
(B) Met **(C) Have met✓**

10. **I shall certainly work all next week except when it ____.**
(A) Is raining✓ (B) Would rain
(C) Will be raining (D) Will rain

11. **Although the Rajput army was outnumbered, the brave general refused to ____.**
(A) Give way (B) Give over
(C) Give in✓ (D) Give out

12. **Having earned a lot of money in business, Mr Saeed ____ his poor cousins.**
(A) Looks down upon✓
(B) Hits upon
(C) Shows off (D) Looks upon

13. **The price of gold as well as silver ____ risen.**
(A) Are (B) Have
(C) Has✓ (D) Is

14. **The building was so old and dilapidated that it was not _____.**
(A) Habitable✓ (B) Habitat
(C) Habitability (D) Habituating

15. **Your son had promised to call you to USA, ____.**
(A) Didn't he (B) Did he
(C) Hadn't he✓ (D) Had he

16. **A large majority of students ____ absent from the college yesterday.**
(A) Were **(B) Was✓**
(C) Has been (D) Had been

17. **He is very keen ____ going abroad, for higher studies.**
(A) For✓ (B) At
(C) Over (D) On

18. **You are not justified ____ laying the blame ________ my door.**
(A) In, over **(B) In, at✓**
(C) At, at (D) Over, at

19. **What you have done _____ no excuse.**
(A) Admits✓ (B) Admits at
(C) Admits about (D) Admits of

20. **Timid by nature, the doctor, who was alone in his house was frightened____.**
(A) Out of wits (B) Out at his wits
(C) At his wits end✓ (D) Out of his wits

Fill with appropriate preposition

21. **He came and sat ____ his wife and son.**
(A) Beside (B) By
(C) Besides **(D) Between✓**

22. **Please open the book _____ page 10.**
(A) On **(B) At✓**
(C) From (D) To

23. **Are you conversant _____ accounts?**
(A) With✓ (B) To
(C) From (D) By

24. **If you persist ____ your views, you will turn everybody against you.**
(A) In✓ (B) On
(C) With (D) Into

25. **Everybody is complaining ____ corruption in public life.**
(A) About (B) On
(C) Of✓ (D) Against

26. **I am sorry I have to go back _____ my promise.**
(A) From (B) By
(C) To **(D) On✓**

27. **Send the book ____ my address.**
(A) On **(B) To✓**
(C) At (D) From

28. **He is very popular ____ his employees.**
(A) In (B) Between
(C) Among **(D) With✓**

29. **This girl is lost ____ all sense of shame.**
(A) To✓ (B) Of
(C) Among (D) With

30. **He was warned ____ the danger quite in time.**
(A) Against (B) About
(C) Of✓ (D) By

TICK THE ANTONYMS

1. **Barren:**
(A) Irrigated (B) Cultivated
(C) Fertile✓ (D) Agricultural

2. **Transparent:**

(A) Translucent (B) Bright
(C) Clear **(D) Opaque✓**

3. Friendly:
(A) Strange (B) Indifferent
(C) Hostile✓ (D) Human

4. Progressive
(A) Retrograde✓ (B) Repressive
(C) Subversive (D) Impending

5. Ominous:
(A) Final (B) Terminating
(C) Auspicious✓ (D) Blessed

6. One who eats human flesh:
(A) Cannibal✓ (B) Furious
(C) Carnivorous (D) Beast
(E) Man-eater

7. A place where birds are kept:
(A) Attic (B) Nursery
(C) Aviary✓ (D) Zoo
(E) None

8. Animals that feed on grass:
(A) Carnivorous **(B) Herbivorous✓**
(C) Insectivorous (D) Graminivorous
(E) Aquarian

9. A thing which easily catches fire:
(A) Efflorescent (B) Callous
(C) Impatient **(D) Inflammable✓**
(E) Fluorescent

10. Speaking too much of oneself:
(A) Equivocal (B) Hypocrite
(C) Egotism✓ (D) Selfish
(E) Egoism

11. GRIM
(A) Dismal **(B) Gay✓**
(C) Poor (D) Forbidding

12. REMOTE
(A) Dirty **(B) Accessible✓**
(C) Far (D) Apex

13. ENCROACH
(A) Disrespect (B) Creep
(C) Backward **(D) Withdraw✓**

14. ESCALATE
(A) Intensify **(B) Decrease✓**
(C) Increase (D) Fixed

15. ETERNAL
(A) Temporary✓ (B) Moral
(C) Religious (D) Unending

16. PANDEMONIUM
(A) Calm✓ (B) Frustration
(C) Efficiency (D) Impishness
(E) Irrelevant

17. PERTINENT (relevant)
(A) Understood (B) Living
(C) Discontented (D) Puzzling
(E) Irrelevant✓

18. PRODIGAL
(A) Large **(B) Thrifty✓**
(C) Consistent (D) Compatible
(E) Remote

19. PRODIGIOUS
(A) Infinitesimal✓ (B) Indignant
(C) Indifferent (D) Insufficient
(E) Indisposed

20. PROFANE
(A) Sanctify✓ (B) Desecrate
(C) Define (D) Manifest
(E) Urge

21. HYPOCRITICAL:
(A) Sincere✓ (B) Shameful
(C) Amiable (D) Modest

22. HUSBANDRY:
(A) Sportsmanship, reasonableness
(B) Wastefulness✓
(C) Friction
(D) Cowardice

23. IRREPARABLE (not correctable):
(A) Proverbial (B) Legible
(C) Correctable✓ (D) Concise

24. JANUNDICED:
(A) Inflame (B) Quickened
(C) Unbiased✓ (D) Aged

25. JEOPARDY:
(A) Patience (B) Courage
(C) Safety✓ (D) Willingness
(E) Liberty

26. TRAGEDY:
(A) Humorous **(B) Comedy✓**
(C) Romance (D) Calamity

27. RECEDE:
(A) Rush **(B) Advance✓**
(C) Approach (D) Forward

28. One can *acquire* fame only by being truthful, honest and faithful.
(A) Lose✓ (B) Deprive
(C) Forsake (D) Surrender

29. Mother Teresa devoted her life to the service of the *poor* and the destitute.
(A) Greedy (B) Noble
(C) Rich✓ (D) Extraordinary

30. Always *avoid* late-night jobs.
(A) Pursue✓ (B) Compel
(C) Inspire (D) Take

31. He is a very *timid* person.
(A) Dashing (B) Outgoing
(C) Bold✓ (D) Chivalrous

32. ADULATION (admiration):
(A) Youth (B) Purity

(C) **Criticize✓** (D) Defense

33. **AMBIGUOUS (not clear):**
(A) Responsible (B) Salvageable
(C) Corresponding **(D) Clear✓**
(E) Auxiliary

34. **CONCILIATE:**
(A) Defend (B) Activate
(C) Integrate **(D) Quarrel✓**
(E) React

35. **DIN (continued loud noise):**
(A) Lightness (B) Safety
(C) Silence✓ (D) Hunger
(E) Promptness

36. **DESECRATE (profane):**
(A) Desist (B) Integrate
(C) Confuse (D) Intensify
(E) Consecrate✓

37. **MANIFEST:**
(A) Limited **(B) Obscure✓**
(C) Faulty (D) Varied

38. **FLAMBOYANT:**
(A) Old fashioned **(B) Restrained✓**
(C) Impulsive (D) Cognizant

39. **FIASCO:**
(A) Cameo (B) Mansion
(C) Pollution **(D) Success✓**

40. **ELUSIVE:**
(A) Deadly (B) Eloping
(C) Evasive✓ (D) Simple

41. **PARABLE:**
(A) Equality **(B) Allegory✓**
(C) Frenzy (D) Folly

42. **SOBRIETY:**
(A) Inebriety✓ (B) Aptitude
(C) Scholasticism (D) Monotony

43. **TENACIOUS:**
(A) Fast running (B) International
(C) Scholasticism **(D) Monotony✓**

44. **UNTENABLE:**
(A) Supportive (B) Tender
(C) Sheepish **(D) Tremulous✓**

45. **ANTITHESIS:**
(A) Velocity (B) Maxim
(C) Similarity✓ (D) Acceleration

46. **AFFABLE:**
(A) Rude✓ (B) Ruddy
(C) Needy (D) Useless

47. **BIZARRE:**
(A) Roomy (B) Veiled
(C) Subdued **(D) Normal✓**

48. **CACOPHONY:**
(A) Discord (B) Dance
(C) Applause **(D) Sweet✓**

49. **CAPRICIOUS:**
(A) Satisfied✓ (B) Insured
(C) Photo (D) Steadfast

50. **DISPARITY:**
(A) Resonance (B) Elocution
(C) Balance✓ (D) Difference

51. **DOGMATIC:**
(A) Benign✓ (B) Canine
(C) Impatient (D) Arbitrary

52. **Amalgamate:**
(A) Equipped (B) Generate
(C) Depress **(D) Separate✓**

53. **Amplify:**
(A) Infer (B) Differ
(C) Distant **(D) Decrease✓**

54. **Apposite:**
(A) Inappropriate (B) Right
(C) Direct✓ (D) Indirect

55. **Anonymous:**
(A) Signed **(B) Defined✓**
(C) Written (D) Balanced

56. **Amicable:**
(A) Unfriendly✓ (B) Ugly
(C) Weak (D) Compromising

57. **Harmony:**
(A) Discrepancy (B) Accordance
(C) Discord✓ (D) Inflight

58. **Summit:**
(A) Climb **(B) Base✓**
(C) Ride (D) Swim

59. **Apex:**
(A) Top **(B) Bottom✓**
(C) Near (D) Far away

60. **Affirmative:**
(A) Approved **(B) Negative✓**
(C) Unfavourable (D) Conformed

61. **Amateur:**
(A) Mature (B) Part-time player
(C) Professional✓ (D) Cultured

62. **PREJUDICE:**
(A) Aversion✓ (B) Gestation
(C) Preliminary (D) Admiration

63. **GOAD:**
(A) Spur✓ (B) Restrain
(C) Pursue (D) Supersede

64. **FAD:**
(A) Eccentricity✓ (B) Custom
(C) Constituent (D) Visage

65. **REFERENCE:**
(A) Disdain (B) Remuneration
(C) Opposite **(D) Retrospection✓**

66. **ZEAL:**
(A) Initiative✓ (B) Coars

(C) Pedagogy (D) Indolence

67. MOURNFUL:
(A) Informal (B) Sympathetic
(C) Private (D) Appropriate
(E) Joyous✓

68. GRANDIOSE (showy):
(A) Docile (B) Unlikely to occur
(C) Simple and unimposing✓
(D) Light in weight

69. LACKLUSTER:
(A) Superficial
(B) Courteous, showing good manner
(C) Vibrant✓
(D) Complex
(E) Abundant

70. CENSURE:
(A) Augment (B) Eradicate
(C) Enthrall **(D) Commend✓**
(E) Reform

71. DESICCATE (dehydrate):
(A) Lengthen (B) Hallow
(C) Exonerate **(D) Saturate✓**
(E) Anesthetize

72. PARSIMONIOUS (miser):
(A) Appropriate **(B) Generous✓**
(C) Complete (D) Radiant
(E) Ongoing

73. Serendipitous:
(A) Calm **(B) Planned✓**
(C) Flat (D) Evil

74. Fetid:
(A) In an embryonic state
(B) Easily enraged
(C) Acclaimed by peers
(D) Having a pleasant odour✓

75. Illusory:
(A) Nimble **(B) Realistic✓**
(C) Powerful (D) Underrated

TICK THE SYNONYMS

1. Severely <u>abusive</u> writing in journals:
(A) Imaginary (B) Speculative
(C) Scurrilous✓ (D) Sarcastic

2. Call upon God or any other power (like law) etc. for help or <u>protection</u>.
(A) Invocation✓ (B) Involution
(C) Inundation (D) Revocation

3. Fear of being enclosed in a small closed space:
(A) Agoraphobia **(B) Claustrophobia✓**
(C) Xenophobia (D) Paranoia

4. One who has become dependent on something or drugs is a/an:
(A) Adamant (B) Edict
(C) Addict✓ (D) Derelict

5. ABEYANCE:
(A) Obedience
(B) Suspended action✓
(C) Excitement (D) Discussion

6. ABSTINENCE (to avoid):
(A) Vulgar display
(B) Deportment (behaviour)
(C) Reluctance
(D) Restrained eating or drinking✓

7. CONFORMITY:
(A) Agreement (act of agreeing)✓
(B) Ambition
(C) Confinement (D) Pride

8. DEFILE:
(A) Manicure (B) Pollute
(C) Improve or make dirty✓
(D) Assemble

9. DISPASSIONATE
(A) Sensual (B) Immoral
(C) Inhibited **(D) Impartial✓**
(E) Scientific

10. EFFACE (to erase)
(A) Countenance (B) Encourage
(C) Recogniz (D) Blackball
(E) Rub out✓

11. INDOLENCE
(A) Sloth✓ (B) Latitude
(C) Poverty (D) Aptitude

12. MAWKISH
(A) Sentimental (B) True
(C) Certain✓ (D) Devious
(E) Carefree

13. MORIBUND
(A) Appropriate (B) Leather bound
(C) Dying✓ (D) Answering
(E) Undertaking

14. INGENUOUS (Artless):
(A) Clever
(B) Stimulating (rousing)
(C) Naive✓ (D) Worried

15. MEDIOCRE:
(A) Average✓ (B) Bitter
(C) Medieval (middle age)
(D) Industrial

16. PRECARIOUS:
(A) Priceless (B) Permanence
(C) Primitive **(D) Hazardous✓**

17. **PONDEROUS:**
(A) Mioist (B) Rambling
(C) Bulky✓ (D) Erect

18. **DEMONSTRATE:**
(A) Display **(B) Protest✓**
(C) Resign (D) Reiterate

19. **OVERT:**
(A) Deep (B) Shallow
(C) Secret✓ (D) Unwritten

20. **KINDLE:**
(A) Ignite✓ (B) Encourage
(C) Ignore (D) Extinguish

21. **ASSERT:**
(A) Acquiesce **(B) Agree✓**
(C) Abjure (D) Abducate

22. **Tariq often walks to school:**
(A) Rerely (B) Never
(C) Always **(D) Sometimes✓**

23. **DISSOLUTE:**
(A) Immoral✓ (B) Repulsive
(C) Honest (D) Distant

24. **NIGGARD:**
(A) Miser✓ (B) Loyal
(C) Divine (D) Shrewd

25. **DILIGENT:**
(A) Intelligent (B) Energetic
(C) Modest **(D) Industrious✓**

26. **OBVERSE:**
(A) Opposite✓ (B) Reverse
(C) Bitter (D) Adverse

27. **FALSE:**
(A) Defective **(B) Untrue✓**
(C) Incorrect (D) Inaccurate

28. **Drinking is a <u>vice</u> which ultimately runs a person.**
(A) Habit (B) Crime
(C) Sin **(D) Evil✓**

29. **The <u>lurid</u> details of the murder in broad daylight sent chilling sensation down the spine of everybody.**
(A) Realistic **(B) Vivid✓**
(C) Bleak (D) Ghastly

30. **Few teachers have been spared the problem of an <u>obstreperous</u> pupil in the class.**
(A) Awkward (B) Lazy
(C) Unruly✓ (D) Sullen

31. **The host looked quite <u>jaded</u> by the time the party was over.**
(A) Miserable (B) Cheerful
(C) Inspiring **(D) Exhausted✓**

32. **Rahim does unpaid work for the <u>charity</u> school.**
(A) Honourable **(B) Honorary✓**
(C) Honest (D) Honorific

33. **CHURLISH, rude:**
(A) Marine (pertaining to the sea)
(B) Economical
(C) Impolite (violent)✓
(D) Compact, reality fitted
(E) Young

34. **CLANDESTINE:**
(A) Abortive **(B) Secret ✓**
(C) Tangible (clear and definite)
(D) Doomed (death)
(E) Approved (permission)

35. **EMANCIPATE:**
(A) Set free✓ (B) Take back
(C) Make worse
(D) Embolden (encourage)
(E) Run away

36. **ADVERSITY:**
(A) Opponent **(B) Hardship✓**
(C) Opening (D) Agency

37. **ADHERE:**
(A) Give up **(B) Stick✓**
(C) Criticise (D) Appear

38. **AMELIORATE:**
(A) Understand (B) Eliminate
(C) Camouflage **(D) Improve✓**

39. **ANNIHILATION:**
(A) Total destruction✓
(B) Digestion
(C) Insult (D) Of any

40. **ASSIMILATE:**
(A) Adopt (B) Absorb
(C) Reject (D) Digest

41. **Arrogance:**
(A) Modest **(B) Haughtiness✓**
(C) Happiness (D) Servile

42. **Annihilate:**
(A) Efface✓ (B) Cultivate
(C) Build (D) Create

43. **Cumbersome:**
(A) Awkward✓ (B) Decline
(C) Handsome (D) Beautiful

44. **Exemplify:**
(A) Over **(B) Illustrate ✓**
(C) Answer (D) Summary

45. **Imperious:**
(A) Proud✓ (B) Temper
(C) Tamper (D) Distant

46. **Luxuriant:**
(A) Beautiful✓ (B) Ugly
(C) Abundant (D) Lovely

47. **Memorable:**
(A) Memorial impose
(B) Worth remembering✓
(C) Mending (D) Striking

48. **Impose:**
(A) Enforce✓ (B) Avoid
(C) Come (D) Bold

49. Alter:
(A) Change✓ (B) Separate
(C) Fixed (D) Arrival

50. IMPECCABLE:
(A) Unmentionable (B) Quotable
(C) Binding **(D) Faultless✓**
(E) Hampering (obstruct)

51. **PARADOX (statement that looks false but is actually correct):**
(A) Exaggeration (overstated)
(B) Contradiction (deny) ✓
(C) Hyperbole
(D) Invective (abusive oratory)
(E) Poetic device

52. **A BOLT FROM THE BLUE:**
(A) Bad luck (B) God sent gift
(C) A feared event
(D) Sudden unwelcome event✓

53. **APE (copy/ imitate):**
(A) To taunt (B) Cheapen
(C) Mimic✓ (D) Steal

54. **HARMONIOUS:**
(A) Jarring **(B) Coherent✓**
(C) Happy (D) Playful

55. **PRODIGAL:**
(A) Wasteful✓
(B) Arrogant, Proud
(C) Extend (D) Multiply

****

CHOOSE THE LETTERED PAIR OF WORDS WHOSE RELATIONSHIP IS MOST LIKE THE RELATIONSHIP EXPRESSED IN THE ORIGINAL LINKED PAIR.

1. **WHISPER: SPEAK**
(A) Brush: Touch✓ (B) Skip: Walk
(C) Listen: Hear (D) Request: Ask

2. **ELUSIVE (evasive): CAPTURE**
(A) Persuasive, Convince
(B) Headstrong: Control✓
(C) Sensible: Decide
(D) Gullible, Trick
(E) Elastic: Stretch

3. **STARE: GLANCE**
(A) Participate: Observe
(B) Scorn: Admire
(C) Hunt: Stalk
(D) Gulp (swallow), sip✓

4. **INFALLIBLE: ERROR**
(A) Irreversible: Cure
(B) Invulnerable: Emotion
(C) Impeccable: Flaw✓
(D) Intolerable: Defect

10. **PROOF: ALCOHOL**
(A) Cream: Milk
(B) Canteen: Water
(C) Tanker: Oil
(D) Octane: Gasoline✓
(E) Pulp: Juice

11. **DAY: SUN**
(A) Sunlight: Daylight
(B) Ray: Sun
(C) Night: Moon✓
(D) Heat: Cold
(E) Moon: Star

12. **HAIR: BALD**
(A) Wig: Curly (B) Egg: Cooked
(C) Rain: Arid✓ (D) Skin: Scarred
(E) Medicine: Healthy

13. **DINGHY: BOAT**
(A) Novel: Book✓
(B) Caone: Paddle
(C) Oar: Water (D) Deck: Stem
(E) Land: Sea

14. **APPLE: TREE**
(A) Silver: Ore
(B) Bronze: Copper
(C) Plank: Wood (D) Glass: Sand
(E) Pearl: Oyster✓

15. **CARNIVORE: MEAT**
(A) Carnivore Vegetable
(B) Herbivore: Plants✓
(C) Vegetarian: Vitamins
(D) Botanist: Herbs
(E) Pollinator: Plants

16. **HORSE: CORRAL:**
(A) Oyster: reef
(B) Dog: muzzle (animal's mouth)
(C) Sheep: flock
(D) Pig: sty✓
(E) Deer: stag

17. **DESCRY: DISTANT:**
(A) Mourn: lost
(B) Whisper: muted
(C) Discern: subtle✓
(D) Destroy: flagrant
(E) Entrap: hostile

18. **SIEVE: SIFT:**
(A) Pendent: Neck
(B) Crowbar: Pry✓
(C) Cement: Trowel
(D) Scales: Justice

Urdu:

1. پنڈت رتن ناتھ سرشار اور مولانا عبدالحلیم شرر جیسے صاحب قلم کس ہندوستان کے علاقہ سے تعلق رکھتے تھے؟
(A) لاہور (B) دہلی
(C) لکھنؤ ✓ (D) اودھ

2. پنڈت رتن ناتھ سرشار کو کیا کہا جاتا ہے؟
(A) شیکسپیئر (B) ورڈز ورتھ
(C) چارلس ڈکنز ✓ (D) ڈاکٹر واٹسن

3. پریم چند کا کون سا ناول سماج کے ظلم کا نمایاں ثبوت ہے؟
(A) میدان عمل (B) بازار حسن ✓
(C) گودان (D) امراؤ جان ادا

4. مضمون 'مامتا' کس کی تصنیف ہے؟
(A) عطاالحق قاسمی (B) احمد ندیم قاسمی ✓
(C) مرزا ادیب (D) پریم چند

5. غالب کی تاریخ ولادت اور تاریخ وفات بتائیں؟
(A) 1869-1797 ✓ (B) 1868-1803
(C) 1878-1800 (D) 1978-1900

6. تم میرے پاس ہوتے ہو گویا
جب کوئی دوسرا نہیں ہوتا
یہ شعر کس کا ہے؟
(A) مومن ✓ (B) غالب
(C) میر تقی میر (D) میر درد

7. 'لاہور کا جغرافیہ' اور 'بلسٹل میں رہنا ہے' کس کے مزاحیہ مضامین ہیں؟
(A) امجد اسلام امجد
(B) ابن انشا
(C) پطرس بخاری ✓
(D) چراغ حسن حسرت

8. قتل حسین اصل میں مرگ یزید ہے
اسلام زندہ ہوتا ہے ہر کربلا کے بعد
اس مشہور شعر کے شاعر کا کیا نام ہے؟
(A) محمد علی جوہر ✓
(B) مومن خان مومن
(C) ابراہیم ذوق
(D) ان میں سے کوئی نہیں

9. لفظ 'شر' کا متضاد کیا ہے؟
(A) بھلائی (B) صواب
(C) ثواب (D) خیر ✓

10. گیت نگاری میں سب اہم نام کس کا ہے؟
(A) ولی دکنی (B) ساحر لدھیانوی ✓
(C) فیض احمد فیض (D) احمد فراز

11. غزل کے کس شعر میں سے شاعر اپنا تخلص استعمال کرتا ہے؟
(A) درمیان والا شعر (B) مطلع
(C) مطلع ثانی (D) مقطع ✓

12. مرزا غالب نے وفات کہاں پائی؟
(A) پانی پت ✓ (B) آگرہ
(C) دہلی (D) لکھنؤ

13. مشہور افسانہ 'ٹوبہ ٹیک سنگھ' کس کی تصنیف ہے؟
(A) اشفاق احمد (B) کرشن چندر
(C) سعادت حسن منٹو ✓ (D) خالدہ حسین

14. "مسجد قرطبہ" کس کی مشہور نظم ہے؟
(A) علامہ اقبال ✓ (B) ن۔م۔ راشد
(C) جوش ملیح آبادی
(D) مولانا الطاف حسین حالی

15. ہتھیلی پر .... جمانا۔
(A) تیل (B) دہی
(C) سرسوں ✓ (D) برف

16. مان نہ مان میں تیرا ....
(A) محسن (B) مہربان
(C) غم خوار (D) مہمان ✓

17. جنڈیالہ شیر خان میں کون سی مشہور ہستی دفن ہے؟
(A) محمد بخش (B) وارث شاہ ✓
(C) قتیل شفائی (D) ہیر سیال

18. پاکستان کا قومی پھول .... ہے۔
(A) سورج مکھی (B) گل داؤدی
(C) چنبیلی ✓ (D) گلاب

19. قرطبہ اور غرناطہ شہر کس یورپی ملک میں واقع ہیں؟
(A) فرانس (B) آئرلینڈ
(C) اسپین ✓ (D) ہالینڈ

20. مشتاق احمد یوسفی کون ہیں؟
(A) مزاح نگار ✓ (B) بزنس مین
(C) صحافی (D) سیاستدان

21. نیکی کر .... میں ڈال۔
(A) کنویں (B) جیب
(C) دریا ✓ (D) کشکول

22. ہمارا قومی ترانہ کس شاعر نے تخلیق کیا؟
(A) فیض احمد فیض (B) ساحر لدھیانوی
(C) حفیظ جالندھری ✓ (D) جوش ملیح آبادی

23. لوک فنکار پٹھانے خان کا آبائی شہر ہے۔
(A) بہاولپور (B) کوٹ ادو ✓
(C) بھکر (D) ملتان

24. مشہور افسانہ 'گڈریا' کس کی تصنیف ہے؟
(A) پروین عاطف (B) اشفاق احمد ✓
(C) غلام عباس (D) کرشن چندر

25. 'علی پور کا ایلی' ناول کس نے لکھا؟
(A) عبداللہ حسین
(B) سمیع آہوجا
(C) ممتاز مفتی ✓
(D) مستنصر حسین تارڑ

26. 'خوشبو' کس شاعر کا دیوان ہے؟
(A) پروین شاکر ✓ (B) جون ایلیا
(C) جوش ملیح آبادی (D) احمد ندیم قاسمی

27. احمد فراز کا آبائی شہر کون سا تھا؟
(A) پشاور (B) نوشہرہ
(C) میانوالی (D) کوہاٹ ✓

28. .... ضرورت کی ماں ہے۔
(A) قحط (B) ایجاد
(C) فراوانی ✓ (D) قلت

29. مندرجہ ذیل میں سے کس شاعری کی نسبت شہر اقبال سیالکوٹ سے ہے؟
(A) حفیظ جالندھری ✓ (B) احسان دانش
(C) فیض احمد فیض (D) منیر نیازی

30. حروف تہجی کے اعتبار سے کون سا لفظ لغت میں پہلے

(C) اسم ظرف (D) اسم مکبر

45. درج ذیل میں کون سا لفظ ہجے کے لحاظ سے درست ہے۔
(A) پرواغ (B) پرواہ
(C) پرواح (D) پروا✓

46. درج ذیل میں کونسا ہجے کے لحاظ سے درست ہے؟
(A) استنداح (B) استفادہ✓
(C) استندد (D) استفادا

47. کون سا فقرہ درست ہے؟
(A) سکول کا نتیجہ سو فیصد رہا✓
(B) شورسن کر میری نیند کھل گئی
(C) شریف بچے گالیاں نہیں دیتے
(D) آپ کی خیریت نیک مطلوب چاہتا ہوں

48. نشیب کا متضاد ہے۔
(A) چڑھتی (B) اونچائی
(C) فراز✓ (D) بلندی

49. درج ذیل میں ضرب المثل تلاش کیجئے۔
(A) عید کا چاند
(B) اپنے منہ میاں مٹھو بننا
(C) بوڑھی گھوڑی لال لگام✓
(D) پانی میں آگ لگانا

50. مشہور تصنیف "یادگار غالب" کے مصنف کون تھے؟
(A) سرسید احمد خان (B) مرزا غالب
(C) علامہ اقبال
(D) الطاف حسین حالی✓

51. "نقش فریادی" کس کا شعری مجموعہ ہے؟
(A) فیض احمد فیض
(B) احمد ندیم قاسمی✓
(C) ناصر کاظمی
(D) منیر نیازی

52. "بابائے اردو" کسے کہا جاتا ہے؟
(A) سر سید احمد خان
(B) ڈپٹی نذیر احمد
(C) مولانا ظفر علی خان
(D) مولوی عبدالحق✓

53. "ڈوبتے کو تنکے کا سہارا" قواعد کی رو سے کیا ہے؟
(A) قول (B) ضرب المثل
(C) کہاوت (D) محاورہ✓

54. مشہور کتب "بجنگ آمد" کے مصنف کون ہیں؟
(A) سید ضمیر جعفری
(B) شفیق الرحمان
(C) کرنل محمد خان✓
(D) مشتاق احمد یوسفی

55. مشہور ڈرامہ "انار کلی" کے مصنف کون ہیں؟
(A) امتیاز علی تاج✓ (B) بانو قدسیہ
(C) اشفاق احمد (D) احمد ندیم قاسمی

56. "یادوں کی بارات" کس کی سوانح عمری ہے؟
(A) ممتاز مفتی (B) قدرت اللہ شہاب
(C) جوش ملیح آبادی✓ (D) ابن انشا

57. مندرجہ ذیل کتب میں کون سی الطاف حسین حالی کی تصنیف نہیں ہے؟
(A) اردوئے معلیٰ✓
(B) مقدمہ شعرو شاعری
(C) مدو جزر اسلام (D) حیات سعدی

آئے گا؟
(A) سنگدل✓ (B) لاپرواہ
(C) ضمانت (D) ظالم

31. درج ذیل میں ضرب المثل کون سی ہے؟
(A) گھوڑے بیچ کر سونا
(B) الٹا چور کوتوال کو ڈانٹے✓
(C) ہوائی قلعے تعمیر کرنا
(D) ہتھیلی پرسرسوں جمانا

32. اردو ادب کی مشہور شخصیت قرۃ العین حیدر کی وجہ شہرت کیا ہے؟
(A) سفر نگاری (B) ناول نگاری✓
(C) مزاح نگاری (D) شاعری

33. مشہور افسانہ 'ٹوبہ ٹیک سنگھ' کس کی تصنیف ہے؟
(A) اشفاق احمد (B) پریم چند
(C) سعادت حسن منٹو✓ (D) امتیاز علی تاج

34. "سیرۃ النعمان" کے مصنف ہیں۔
(A) شبلی نعمانی✓ (B) رشید احمد صدیقی
(C) شیخ محمد اکبر (D) عبداللہ حسنی

35. مشہور ڈرامہ "قرطبہ کا قاضی" کس کی تصنیف ہے؟
(A) سید امتیاز علی تاج✓ (B) احمد ندیم قاسمی
(C) پطرس بخاری (D) سعادت حسن منٹو

36. 'خوشبو' کس کی شاعری کا مجموعہ ہے؟
(A) کشور ناہید (B) ناصر کاظمی
(C) پروین شاکر✓ (D) فیض احمد فیض

37. مندرجہ ذیل میں ضرب المثل کون سی ہے؟
(A) اپنے منہ میاں مٹھو بننا
(B) بوڑھی گھوڑی لال لگام✓
(C) عید کا چاند ہونا
(D) پانی میں آگ لگانا

38. مشہور ناول 'اداس نسلیں' کس کی تصنیف ہے؟
(A) بانو قدسیہ (B) اشفاق احمد
(C) عبداللہ حسین✓ (D) قرۃ العین حیدر

39. مسدس کے ہر بند میں کتنے مصرعے ہوتے ہیں؟
(A) سات (B) پانچ
(C) چھ✓ (D) چار

40. درج ذیل شعرا میں سے 'عوامی شاعر' کسے کہا جاتا ہے؟
(A) نظیر اکبر آبادی✓ (B) الطاف حسین حالی
(C) فیض احمد فیض (D) علامہ اقبال

41. جملہ کسے کہتے ہیں؟
(A) بامعنی الفاظ کا مجموعہ✓
(B) حرفوں کا مجموعہ
(C) وہ فقرہ جس میں فاعل نہ ہو
(D) دو یا دو سے زیادہ الفاظ کا مجموعہ

42. مشہور نظم 'طلوع اسلام' کے شاعر کون ہیں؟
(A) احسان دانش (B) علامہ اقبال
(C) حفیظ جالندھری✓ (D) الطاف حسین حالی

43. درج ذیل شعر کس کا ہے؟
سب کہاں کچھ لالہ و گل میں نمایاں ہوگئیں
خاک میں کیا صورتیں ہونگی کہ پنہاں ہوگئیں
(A) حسرت موہانی (B) میر تقی میر
(C) علامہ اقبال (D) اسد اللہ غالب✓

44. درج ذیل الفاظ قواعد کی مدد سے کیا ہیں؟
پنکھڑی، ٹوکری، پہاڑی
(A) اسم مفعول (B) اسم تصغیر✓

72. "مسدس حالی" کا اصل نام ہے:
(A) مدوجزر اسلام✓ (B) دیوان حالی
(C) کلیات حالی (D) شاہنامہ اسلام

73. پاکستان کے کس صوبے کو "باب اسلام" کہا جاتا ہے؟
(A) بلوچستان (B) پنجاب
(C) سرحد (D) سندھ✓

74. "جنت ماں کے قدموں تلے ہے"
(A) ضرب المثل
(B) ارشاد نبوی ﷺ ✓
(C) قول ہے
(D) قرآنی آیت کا ترجمہ ہے

75. مندرجہ ذیل میں سے کس لفظ کے ہجے درست نہیں ہیں؟
(A) محوزہ✓ (B) فرہنگ
(C) مرقع (D) مہوش

76. عقائد میں توحید کے بعد کس کا درجہ آتا ہے؟
(A) زکوٰۃ (B) حج
(C) رسالت✓ (D) نماز

77. جھیل سیف الملوک کس جگہ واقع ہے؟
(A) وادی کاغان✓ (B) وادی کوئٹہ
(C) وادی ہنزہ (D) وادی سوات

78. مندرجہ ذیل شعر کس کا ہے:
قتل حسین اصل میں مرگ یزید ہے
اسلام زندہ ہوتا ہے ہر کربلا کے بعد
(A) غالب (B) محمد علی جوہر✓
(C) حالی (D) علامہ اقبال

79. رباعی کا سب سے بڑا اور مقبول شاعر کون ہے؟
(A) غالب (B) عمر خیام✓
(C) حافظ (D) فردوسی

80. مرثیہ کس نوعیت کی شاعری کو کہتے ہیں؟
(A) تحسینی (B) العیہ✓
(C) رزمیہ (D) مزاحیہ

81. کس پنجابی شاعر کا کلام سکھوں کی مذہبی کتاب کا حصہ ہے؟
(A) بابا فرید (B) بلھے شاہ
(C) سلطان باہو (D) وارث شاہ✓

82. روزنامہ 'جنگ' کے بانی کا نام کیا ہے؟
(A) ان میں سے کوئی نہیں
(B) میر خلیل الرحمٰن✓ (C) میر شکیل الرحمٰن
(D) میر جاوید الرحمٰن

95. نسیم حجازی کی وجہ شہرت کیا ہے؟
(A) افسانہ نگاری (B) شاعری
(C) تاریخی ناول✓ (D) جاسوسی ناول

83. 'اک چادر میلی سی' کس کا مشہور ناول ہے؟
(A) کشور ناہید (B) منشی پریم چند
(C) کرشن چندر (D) راجندر سنگھ بیدی✓

84. علامہ اقبال نے ایم اے کی ڈگری کس مضمون میں حاصل کی؟
(A) اسلامیات (B) انگریزی
(C) نفسیات (D) فلسفہ✓

85. "امراؤ جان ادا' کس کی تحریر ہے؟
(A) پریم چند (B) ہادی رسوا✓
(C) رفیق احمد (D) سرسید

58. "آواز دوست" کے مصنف کون ہیں؟
(A) عطا الحق قاسمی (B) ممتاز مفتی
(C) اشفاق احمد (D) مختار مسعود✓

59. مشہور ڈرامہ "قرطبہ کا قاضی" کس کی تصنیف ہے؟
(A) امجد اسلام امجد
(B) سید امتیاز علی تاج✓
(C) پطرس بخاری
(D) احمد ندیم قاسمی

60. درج ذیل شعر کس کا ہے؟
بس کہ دشوار ہے ہر کام کا آساں ہونا
آدمی کو بھی میسر نہیں انساں ہونا
(A) فیض احمد فیض (B) الطاف حسین حالی
(C) اسد اللہ غالب✓ (D) علامہ محمد اقبال

61. مولانا جلال الدین رومی کا مزار قونیہ میں ہے۔ قونیہ کس ملک کا شہر ہے؟
(A) شام (B) ترکی✓
(C) عراق (D) ایران

62. مشہور کہانی "اوور کوٹ" کے مصنف کون ہیں؟
(A) حسینہ معین (B) غلام عباس✓
(C) سید امتیاز علی تاج (D) سعادت حسن منٹو

63. "اردو کی آخری کتاب" کس کی تصنیف ہے؟
(A) مشتاق احمد یوسفی (B) ضمیر جعفری
(C) کرنل محمد خان (D) ابن انشا✓

64. درج ذیل شعر کس کا ہے؟
جو رکے تو کوہ گراں تھے ہم جو چلے تو جاں سے گزر گئے
رہ یار ہم نے قدم قدم تجھے یادگار بنادیا
(A) احمد ندیم قاسمی (B) حفیظ جالندھری
(C) حبیب جالب (D) فیض احمد فیض✓

65. مندرجہ ذیل میں سے کون سے شاعر اپنی مرثیہ نگاری کے لئے مشہور ہیں؟
(A) داغ دہلوی (B) میرانیس✓
(C) میر تقی میر (D) نظیر اکبر آبادی

66. "علی پور کا ایلی" کس کی خود نوشت سوانح عمری ہے؟
(A) سرسید احمد خان (B) ممتاز مفتی✓
(C) اشفاق احمد (D) قدرت اللہ شہاب

67. "طاق نسیاں پر رکھنا" کا مطلب ہے:
(A) حفاظت سے رکھنا (B) قطع تعلق کرنا
(C) بھول جانا✓ (D) سجاوٹ کرنا

68. حروف تہجی کے لحاظ سے کون سا لفظ لغت میں پہلے آئے گا؟
(A) سنگدل✓ (B) ضمانت
(C) لاپروا (D) ظالم

69. "رائی کا پہاڑ بنانا" کا مطلب ہے:
(A) مشکل کام کرنا (B) تنقید کرنا
(C) مبالغے سے کام لینا✓ (D) جدوجہد کرنا

70. علامہ اقبال کی کون سی کتاب میں ان کا اردو اور فارسی کلام اکٹھا چھپا ہے؟
(A) ارمغان حجاز✓ (B) بانگ درا
(C) بال جبریل (D) ضرب کلیم

71. جو لفظ کسی وصف کی وجہ سے مشہور ہو جانے اسے کیا کہتے ہیں؟
(A) خطاب (B) کنیت
(C) عرف✓ (D) لقب

Everyday Science:

1. Epistemology is the study of:
(A) Knowledge✓ (B) Insects
(C) Parasites (D) Religions

2. The Earth takes about _______ to complete one rotation around its axis.
(A) 48 hours (B) One month
(C) 24 hours✓ (D) 365 days

3. When a gas turns into a liquid, the process is called:
(A) Condensation✓ (B) Evaporation
(C) Deposition (D) Sublimation

4. Yeast used in making of bread is a:
(A) Fungus (B) Plant
(C) Bacteria✓ (D) Seed

5. The disease Diphtheria affects the _________ in the human body.
(A) Kidneys (B) Intestines
(C) Throat✓ (D) Joints

6. LED technology is energy efficient. What does LED stand for?
(A) Low Energy Data
(B) Low Energy Diode
(C) Light Emitting Diode✓
(D) None of these

7. What was the code name given to United States Navy SEALS operation leading to elimination of Osama bin Ladin in Abbottabad?
(A) Lion Heart
(B) Neptune Spear✓
(C) Geronimo (D) Shockwave

8. Pedagogy is a science of:
(A) Children disease (B) Language
(C) Civilization (D) Teaching✓

9. How many acres are there in one hectare?
(A) 2.47✓ (B) 3.47
(C) 4.47 (D) 5.47

10. Liquids that evaporate quickly are known as _________ liquids.
(A) Viscous (B) Transient
(C) Volatile✓ (D) Light

11. If a ship travels from fresh water to a sea or ocean, it will:
(A) Rise a little higher✓
(B) Sink completely
(C) Sink a little lower
(D) Remain unaffected

12. Which one of the following fruits / vegetables is a good source of potassium?
(A) Beetroot (B) Bananas✓
(C) Sweet potatoes (D) Spinach

13. What is the chemical name of bleaching powder?
(A) Calcium Hypochlorite✓
(B) Calcium Chlorate
(C) Calcium Chloride
(D) Chlorine

14. Which one of the following greenhouse gases has the greatest warming effect?
(A) Carbon dioxide✓
(B) Carbon monoxide
(C) Methane (D) Helium

15. What is the function of the heart pacemaker?
(A) It decreases the heartbeat
(B) It regulates the heartbeat✓
(C) It accelerates blood supply to the heart
(D) All of these

16. What is the Richter Scale used to measure?
(A) Flood (B) Volcano
(C) Earthquake✓ (D) Tsunami

17. Which body organ produces urine?
(A) Pancreas (B) Uterus
(C) Kidney✓
(D) Large intestine

18. What are Newtons used to measure?
(A) Gravity✓ (B) Volcano
(C) Earthquake (D) Tsunami

19. What is the most abundant element in the universe?
(A) Hydrogen (B) Oxygen
(C) Sodium✓ (D) Copper

20. How many chambers are there in the human heart?
(A) 2 (B) 4✓
(C) 3 (D) 6

21. Which vitamin is provided by sunlight to the body?
(A) Vitamin A (B) Vitamin B
(C) Vitamin C (D) Vitamin D✓

22. The enzyme-linked immunosorbent assay (ELISA) is used to detect:
(A) Antibodies✓ (B) Pathogens
(C) Tissues (D) Chemicals

23. What is chlamydomonas?
(A) An algae✓ (B) A fungus
(C) An animal (D) A fossil

24. What is the most common salt in seawater?
(A) Calcium Carbonate
(B) Potassium Chloride
(C) Sodium Chloride✓
(D) Magnesium Sulphate

25. The organ in the body which accumulates iodine is:
(A) Pituitary gland
(B) Thyroid gland✓
(C) Thymus (D) Parathyroid

26. Who invented chronometer?
(A) John Harrison✓ (B) Marconi
(C) Dalton (D) Samuel Francis

27. Seawater is water from a sea or:
(A) Bay (B) River
(C) Ocean✓ (D) Stream

28. Which of the following gases is used for refrigeration?
(A) Chlorine (B) Ammonia✓
(C) Phosphine (D) Carbon Dioxide

29. Cytology is the:

(A) Study of living cells✓
(B) Study of harmones
(C) Study of seeds
(D) Study of surface tension

30. Which among the following is a positively charged particle emitted by a radioactive element?
(A) Beta rays (B) Alpha rays✓
(C) Gamma rays (D) Cathode rays

31. If there is no sun, the color of the sky would be:
(A) Orange (B) Blue
(C) Yellow
(D) None of these✓

32. Which of the following is not a chemical reaction?
(A) Burning of a paper
(B) Conversion of water into steam✓
(C) Digestion of food
(D) Burning of coal

33. A chronometer measures:
(A) Sound waves (B) Time✓
(C) Color contrast (D) Water waves

34. The lightest particle of the matter is:
(A) Electron✓ (B) Neutron
(C) Proton (D) Deuteron

35. Meteorology is:
(A) Science of atmosphere✓
(B) Study of weights & measures
(C) Study of growth
(D) Study of stars

36. The credit of developing the polio vaccine goes to:
(A) Jonas Salk✓ (B) Albert Sabin
(C) Salmon Waksman
(D) None of these

37. Who invented the ballpoint pen?
(A) Waterman (B) Oscar
(C) Wilson (D) Laszlo Biro✓

38. Blaise Pascal is associated with:
(A) Calculation Machine
(B) Computer
(C) Cinema (D) Laszlo Biro

39. A metal which is liquid at room temperature is:
(A) Gold (B) Aluminium
(C) Mercury✓ (D) Platinum

40. Study of earthquakes is known as:
(A) Ecology (B) Seismology✓
(C) Numismatics (D) None of these

41. Ecology deals with:
(A) Birds
(B) Cell formation
(C) Relations between organisms and their environment✓
(D) Tissues

42. Oncology is the study of:
(A) Plants (B) Cancer✓
(C) Mammals (D) Soil

43. Optic fibres are mainly used for which of the following?
(A) Weaving
(B) Eye Surgery
(C) Communication✓
(D) Food Industry

44. The first test-tube baby of the world was born in:
(A) France (B) Philippines
(C) Britain✓ (D) USA

45. What makes a lemon sour?
(A) Tartaric acid (B) Citric acid✓
(C) Acetic acid
(D) Hydrochloric acid

46. Who discovered the solar system?
(A) Copernicus✓ (B) Newton
(C) Galileo (D) Kepler

47. Fathom is the unit of measurement for:
(A) Sound (B) Depth✓
(C) Energy (D) Time

48. Which is the hardest among following?
(A) Radium (B) Diamond✓
(C) Graphite (D) Gold

49. Which of the following is associated with Einstein?
(A) Radioactivity
(B) Theory of Relativity✓
(C) Rocket Propulsion
(D) Quantum Theory

50. Who among the following received Nobel Prize twice?
(A) Frederic Joliot (B) Marie Curie✓
(C) Irene Curie (D) John Wheeler

51. The smallest gland in the body is:
(A) Adrenal (B) Pancreas
(C) Pineal gland✓ (D) Pituitary

52. The first astronaut who landed on the Moon?
(A) Yuri Gagarin
(B) Neil Armstrong✓
(C) Neil Bohr (D) None of these

53. Silk in produced by:
(A) Larva of silkworm✓
(B) Eggs of silkworm
(C) Pupa of silkworm
(D) None of these

54. Scurvy is a disease of:
(A) Eyes (B) Skin✓
(C) Hair (D) Liver

55. What is the Richter Scale used to measure?
(A) Tsunami (B) Food
(C) Volcano (D) Earthquake✓

56. Melling point of acetanilide is:
(A) 51°C (B) 61°C✓
(C) 71°C (D) 81°C

57. Melling point of acetanilide is:
(A) 110°C (B) 112°C✓
(C) 114°C (D) 116°C

58. Acetaldol is used in the vulcanization of:
(A) Wood (B) Rubber✓
(C) Plastic (D) Water

59. Accumulator is a device for storing:
(A) Electricity✓ (B) Charge
(C) Current (D) Resistance

60. Glues and cements are:
(A) Adiabatics (B) Adhesives✓
(C) Adatoms (D) Acyls

61. A unit of loudness, used in measuring the intensity of sound is:
(A) Phon✓ (B) Phonon
(C) Phosphor (D) None

62. A colourless, inflammable poisonous gas with an unpleasant smell is:
(A) Phosphate (B) Phosphine✓
(C) Phosphite (D) None

63. The study of the action of chemical substances upon animals is:
(A) Pharmacology✓ (B) Pharmacy
(C) Phenacetion (D) None

64. Melting point of phenol, a white crystalline solid is:
(A) 21°C (B) 31°C
(C) 41°C✓ (D) 51°C

65. The dress made out of which of the following materials is safest to wear while cooking?
(A) Terylene✓ (B) Silk
(C) Nylon (D) Cotton

66. Cycloprophane is a colourless inflammable gas, used as a/an:
(A) Crystal (B) Solvent
(C) Anaesthetic✓ (D) Solate

67. Philology is:
(A) Scientific study of literary texts✓
(B) Study of bones
(C) Study of muscles
(D) Study of architecture

68. The 1st satellite was launched by:
(A) UK (B) France
(C) USSR✓ (D) Japan

69. Who was the surgeon who pioneered antiseptic surgery in 1865?
(A) John Sleeman (B) Edward Jenner
(C) Joseph Lister✓ (D) A. Sabine

70. Day and night changes are due to:
(A) Earth's rotation around its axis✓
(B) Earth's revolution
(C) Earth's rotation accompanied with its revolution
(D) None of these

71. The energy generation in stars is due to:
(A) Fusion of heavy nuclei
(B) Fission of heavy nuclei
(C) Fusion of light nuclei✓
(D) None of these

72. The filament of an electric bulb is made of:
(A) Tungsten✓ (B) Carbon
(C) Iron (D) None of these

73. Fiber optics technology is being used in:
(A) Oil and gas pipelines control and monitoring system
(B) Telecommunication✓
(C) Electrical power control and distribution monitoring system
(D) All of the above

74. Which vitamin protects skin of the human body?
(A) D (B) A✓
(C) B_1 Complex (D) C

75. Solar System consists of:
(A) Eleven planets
(B) Eight planets✓
(C) Nine planets
(D) Ten planets

76. The earth's rotation on its axis is from:
(A) West to East✓ (B) South to North
(C) North to South (D) East to West

77. "Dosimeter" is a device used to measure: -
(A) High temperatures
(B) Nuclear radiation for safety purposes✓
(C) The speed of wind or any other gas
(D) Heat radiation

78. What do you understand by the disease "Insomnia"?
(A) Depression
(B) Inability to sleep✓
(C) Colour blindness
(D) None of the above

79. A doctor specialist in skin diseases is called:
(A) Dermatologist✓
(B) Cardiologist
(C) Endocrinologist
(D) None of the above

80. "Ornithology" is the study of:
(A) Sea plants (B) Birds✓
(C) Insects (D) Sea animals

81. What do you understand by "Choreography"?
(A) The steps and movement in dances✓
(B) The study of universe
(C) The study of secret writing
(D) Techniques used in space travelling

82. Which of the following gases is mainly causing global warming?
(A) Hydrogen (B) Nitrogen
(C) Methane (D) Carbon dioxide✓

83. Which of the following gases is most predominant in the Sun?
(A) Ozone (B) Helium
(C) Hydrogen✓ (D) Nitrogen

84. Vitamins were discovered by:
(A) Funk✓ (B) Moseley
(C) Chadwick (D) Frank Whittle

85. Biogas is the common name of:
(A) Oxygen gas (B) Natural gas✓
(C) Hydrogen gas (D) Nitrogen gas

86. Who is the founder of 'Big Bang Theory?
(A) George Lemaitre✓
(B) Tycho Brahe
(C) Edwin Hubble
(D) Issac Asimov

87. What is the diameter of Earth?
(A) 14756 Kilometre

(B) 10556 Kilometre
(C) 12756 Kilometre✓
(D) None of these

88. The time required by moonlight to reach the Earth is:
(A) 3 seconds (B) One second
(C) 1.3 second✓ (D) 2 seconds

89. Poise is the unit of:
(A) Quantity (B) Velocity
(C) Density **(D) Viscosity✓**

90. Who is the founder of Chemistry?
(A) Al-Bairuni
(B) Muhammad Bin Zikrya Al-Razi
(C) Jabir Bin Hayyan✓
(D) Ibn-ul-Haitham

91. The acid prepared by Jabir Bin Hayyan is:
(A) Citric Acid (B) Phosphoric Acid
(C) Carbonic Acid **(D) Sulphuric Acid✓**

92. Method for the preparation of varnish was discovered by:
(A) Ibn-ul-Haitham **(B) Jabir Bin Hayyan✓**
(C) Muhammad Bin Zikrya Al-Razi
(D) Al-Bairuni

93. Enzymes are made of:
(A) Proteins✓ (B) Oil
(C) Carbon (D) Silica

94. One ounce is equal to how many grams?
(A) 28.85 (B) 28.65
(C) 27.95 **(D) 28.35✓**

95. Wind blowing in a spiral form around a region of low atmospheric pressure is a:
(A) Tornado (B) Hurricane
(C) Cyclone✓ (D) Anticyclone

96. When the days and nights are equal, the rays of the sun directly fall on the:
(A) North Pole **(B) Equator✓**
(C) Tropic of Cancer (D) South Pole

97. On June 21, the sun is vertically overhead the:
(A) Tropic of Cancer✓ (B) Tropic of Capricorn
(C) Equator
(D) Position of the sun is not definite

98. Which of the following metals is not only magnetic but also radioactive?
(A) Thorium✓ (B) Aluminium
(C) Iron (D) Platinum

99. "Thryoid Gland" is located in ______ of human body.
(A) Stomach (B) Thorax
(C) Leg **(D) Neck✓**

100. In human body, Gall Bladder is part of ______ System.
(A) Nervous (B) Reproductory
(C) Digestive✓ (D) Respiratory

101. Which of the following blood vessels carry blood from the human body to the heart?
(A) Veins✓ (B) Arteries
(C) Capillaries (D) None of these

102. Glaucoma is caused by increase in pressure within:
(A) Eyeball✓ (B) Heart
(C) Lungs (D) Kidneys

103. Lemon is a good source of vitamin:
(A) D **(B) C✓**
(C) A (D) E

104. What is "Acoustics"?
(A) Science of Electromagnetic Waves System
(B) Science of Waves
(C) Science of Sound✓
(D) Science of Light

105. For galvanizing of iron, which of the following metals is used?
(A) Zinc✓ (B) Aluminium
(C) Copper (D) Lead

106. Sound cannot travel through:
(A) Gases **(B) Vacuum✓**
(C) Liquids (D) Solids

107. X-Rays were discovered by:
(A) Madame Curie **(B) Roentgen✓**
(C) Thomson (D) Rutherford

108. Breeding and management of bees is known as:
(A) Apiculture✓ (B) Sericulture
(C) Horticulture (D) None of these

109. Hepatitis causes inflammation of:
(A) Stomach (B) Lungs
(C) Liver✓ (D) Kidneys

110. Isotopes are atoms of the same element with different number of:
(A) Positrons **(B) Protons✓**
(C) Electrons (D) Neutrons

111. Which one of the following is a vector quantity?
(A) Velocity✓ (B) Speed
(C) Temperature (D) Mass

112. Dolly was the name of the:
(A) First dog in space
(B) First cloned sheep✓
(C) First test-tube baby
(D) Oldest human fossil

113. Greenhouse Effect is mainly caused by excess of ________ in the atmosphere.
(A) Hydrogen sulfide **(B) Carbon dioxide✓**
(C) Carbon monoxide (D) Nitrogen

114. Which hormone is responsible for production of milk in human body?
(A) Testosterone (B) Oxytocin
(C) Prolactin✓ (D) Thyroxine

115. A drop of water is roughly spherical because of:
(A) Viscosity of water
(B) Surface tension✓
(C) Low air pressure
(D) Air resistance

116. Our skin produces ______ when exposed to sunlight.
(A) Vitamin B (B) Vitamin C
(C) Vitamin K **(D) Vitamin D✓**

117. The chemical name for common salt is ________.
(A) Nitrogen
(B) Sodium Chloride✓
(C) Potassium Glucomate
(D) Sulphuric Acid

118. ______ is the most common colour in nature.
(A) Orange (B) Green✓
(C) Black (D) Blue

119. Cholesterol level is analyzed in ______ sample.
(A) Stool (B) Urine
(C) Sputum (D) Blood✓

120. Ozone layer protects life on earth from ________.
(A) Ultraviolet rays✓ (B) Meteorites
(C) Humidity (D) Greenhouse gases

121. Chemical formula for water is ________.
(A) H_2O_2 (B) CH
(C) Na(D) H_2O✓

122. Tsunami is ________
(A) Snowstorm (B) Windstorm
(C) Cyclone (D) Massive wave in sea caused by an earthquake✓

123. Ecosystem refers to ________.
(A) Air Humidity (B) Sea Salt
(C) Earth Heat (D) Earth Environment✓

124. Gynaecology is a branch of ________.
(A) Chemistry (B) Geology
(C) Physics (D) Medicine✓

125. Optic Fibre System is a:
(A) Defense Mechanism
(B) Telecommunication System✓
(C) Air Raid System
(D) None of these

126. Diabetes is caused due to the deficiency of:
(A) Insulin✓ (B) Vitamin B
(C) Iron (D) Calcium

127. It is difficult to cook on mountains because of:
(A) Lack of oxygen
(B) Low atmospheric pressure✓
(C) Low temperature
(D) High atmospheric pressure

128. Which poisonous gas is produced when coal is burnt without enough air supply?
(A) Hydrogen (B) Carbon monoxide✓
(C) Nitrogen (D) Ammonia

129. 1 square foot is equal to:
(A) 144 square inches✓
(B) 48 square inches
(C) 72 square inches
(D) 24 square inches

130. A device that converts chemical energy into electrical energy is called:
(A) Television (B) Generator
(C) UPS (D) Battery✓

131. Which of the following has the highest electrical conductivity?
(A) Wood (B) Iron
(C) Steel (D) Silver✓

132. Hematology is the study of:
(A) Insects (B) Space
(C) Blood✓ (D) Sound

133. Which of the following is not a primary colour?
(A) Orange✓ (B) Green
(C) Blue (D) Red

134. Sunlight is a source of:
(A) Vitamin D✓ (B) Vitamin B
(C) Vitamin C (D) Vitamin A

135. Which component of diet prevents constipation?
(A) Vitamins (B) Minerals
(C) Proteins (D) Fiber✓

136. Which of the following protects the body against disease and infection?
(A) Red blood cells (B) Platelets
(C) White blood cells✓ (D) Hemoglobin

137. Which gas is used in advertising lights?
(A) Carbon dioxide (B) Neon✓
(C) Helium (D) Argon

138. Biology is the study of:
(A) All living things✓ (B) Animals
(C) Micro-organisms (D) Plants

139. The process of photosynthesis in plants takes place in:
(A) Root (B) Leaf✓
(C) Flower (D) Stem

140. Which of the following substances is used in match sticks?
(A) Acid (B) Sulpher
(C) Phosphorous✓ (D) Zinc

141. Which food contains the highest concentration of protein & iron?
(A) Meat✓ (B) Vegetables
(C) Bread (D) Fruits

142. Which of the following is a renewable source of energy?
(A) Water✓ (B) Gas
(C) Electricity (D) Coal

143. The Theory of Relativity was developed by:
(A) Marconi (B) Edison
(C) Einstein✓ (D) Newton

144. Who invented the Steam Locomotive?
(A) Alexander (B) Stephenson✓
(C) JRD Tata (D) Edison

145. Hepatitis and jaundice are the diseases of:
(A) Kidney (B) Brain
(C) Liver✓ (D) Heart

Covid-19

1. According to a new UN report, which continent could see 300,000 COVID-19 deaths this year?
(A) Asia (B) North America
(C) Africa✓ (D) Europe

2. Pakistani-American doctor and a state senator for Connecticut who helped develop a ventilator device that makes it possible to treat seven COVID-19 patients at once is:
(A) Dr Imtiaz Hussain
(B) Dr Saud Anwar✓
(C) Dr Ejaz Khan
(D) Dr Shahid Anwar

3. Which country banned the use of saliva, sweat to shine Cricket ball under COVID-19 guidelines?

(A) Australia✓ (B) India
(C) England (D) Pakistan

4. The virtual Summit of the Non Aligned Movement (NAM) on COVID-19 pandemic has been organised at the initiative of which country?
(A) Kazakhstan (B) Azerbaijan✓
(C) Uzbekistan (D) None of above

5. The official name of the virus causing the COVID-19 given by WHO is_____.
(A) SARS-CoV 1 (B) MERS -CoV 1
(C) SARS-CoV 2✓ (D) MERS-CoV 2

6. From which country the first case of a Tiger tested positive of COVID-19 has been reported?
(A) UK (B) USA✓
(C) UAE (D) India

7. Recently, which country's princess Maria Teresa became the first to die from COVID-19?
(A) Germany (B) Spain✓
(C) Italy (D) UK

8. Which country recommended all the world countries to use Tan Re Qing to treat COVID-19?
(A) CHINA✓ (B) CUBA
(C) RUSSIA (D) USA

9. Which country's Finance Minster committed suicide because of "deeply worried" over how to cope with the economic fallout from the COVID-19?
(A) Spain (B) Italy
(C) Denmark (D) Germany✓

10. What group(s) of people has/have a higher risk of developing severe disease and death due to Coronavirus (Covid-19)?
I. Women and Children
II. 60 years old or above
III. people already underlying medical conditions ;
(A) I only (B) II only
(C) I and II (D) II and III✓

11. Video conference of SAARC leaders on COVID-19 held on which date?
(A) 14 March 2020 (B) 15 March 2020✓
(C) 16 March 2020 (D) None of these

12. Which global organisation has launched the "COVID Action Platform" to convene the business community to support for COVID-19?
(A) World Bank
(B) World Economic Forum✓
(C) International Monitory Fund
(D) United Nations

13. In March 2020, the World Health Organization (WHO) decleared Covid-19 as a_____.
(A) Pandemic✓ (B) Endemic
(C) Epidemic (D) Zoonotic

14. Which country is the first to develop an antibody test to identify the novel coronavirus (COVID-19)?
(A) China (B) USA
(C) Singapore✓ (D) Japan

15. World Health Organization named deadly virus from China as _____.
(A) COVID-19✓ (B) NOVID-19
(C) NCV-19 (D) None of these

16. _____stayed away from the regional trade officials video conference on Covid-19 hosted by India.
(A) Pakistan✓ (B) Nepal
(C) Bangladesh (D) Maldives

17. Through which social media app, Govt launched Coronavirus (COVID-19) infor-mation service ?
(A) Twitter (B) Facebook
(C) WhatsApp✓ (D) None of these

18. Which border was ordered to open by Prime Minister Imran Khan on 20th March, 2020, despite the global pandemic of COVID-19?
(A) Chaman border✓
(B) Wagah border
(C) China border
(D) All of above

19. Pakistan recorded its first Coronavirus COVID-19 death on_____.
(A) 16 March 2020 (B) 17 March 2020
(C) 18 March 2020✓ (D) 19 March 2020

20. Corona Virus (covid-19) came to Pakistan from which neighboring country?
(A) Iran✓ (B) China
(C) Afghanistan (D) India

21. Which two countries collaborate to develop rapid testing for COVID-19 under 30 seconds?
(A) USA-UK (B) USA-Pakistan
(C) India-Israel✓ (D) China-Pakistan

22. Which country police train dogs to sniff out Covid-19?
(A) Brazil (B) Chile✓
(C) Algeria (D) None of Above

23. Which nation has become the world's first to successfully complete human trials of its COVID vaccine?
(A) US (B) China
(C) Germany (D) Russia✓

24. Which country overtakes Russia to become third worst-hit nation by COVID-19?
(A) Peru (B) India✓
(C) Chile (D) UK

25. The theme of the World Day Against Child Labour (WDACL) 2020 was ______ ?
(A) "The End of Child Labour: Within Reach"
(B) "protect children more than ever from COVID-19"✓
(C) "Generation Safe & Healthy"
(D) "Children shouldn't work in fields, but on dreams!"

26. Which global organisation launched a new initiative called COVID-19 Technology Access Pool (C-TAP)?
(A) World Health Organisation✓
(B) World Trade Organisation
(C) UNICEF (D) World Bank

27. Which venue was originally scheduled for the 46th G-7 summit 2020, that has been postponed due to Covid-19 pandemic?
(A) France (B) United States✓
(C) Germany (D) Italy

General Knowledge:

Basics of Information Technology

1. The name for the screen clarity is:
(A) Resolution✓ (B) Discrete
(C) Pixel (D) LCD

2. Collection of raw facts and figures is called:
(A) Information (B) Processing
(C) Data✓ (D) Output

3. Data processing is also called:
(A) Data computing✓
(B) Information technology
(C) Information system
(D) Calculating

4. An electronic device that accepts, processes data and produces information is called:
(A) Input device
(B) Computer✓
(C) Output device
(D) Operating system

5. ________ is category software(s).
(A) Application software
(B) System software
(C) Both (a) and (b)✓
(D) None of these

6. ________ is an example of packaged software.
(A) MS Word (B) Front Page
(C) MS-Access (D) All✓

7. ________ is not an application software.
(A) Internet (B) Device driver✓
(C) Games
(D) Multimedia software

8. An Inkjet printer is an example of a(n):
(A) LASER printer
(B) Impact printer
(C) COM printer
(D) Non-Impact Printer✓

9. CPU stands for:
(A) Centre Product Unit
(B) Central Programming Unit
(C) Control Program Unit
(D) Central Processing Unit✓

10. ________ is secondary storage device.
(A) CD-ROM✓ (B) ROM
(C) Cache (D) RAM

11. ________ is secondary storage device.
(A) Hard disk drive
(B) CD-ROM drive
(C) Tape drive
(D) All✓

12. The device driver is an example of:
(A) Application Software
(B) System Software✓
(C) Freeware
(D) Shareware

13. ________ is Input device.
(A) Keyboard
(B) Touchpad
(C) Microphone
(D) All✓

14. ________ is not an example of input device.
(A) Speaker✓
(B) Scanner
(C) Mouse
(D) Digital camera

15. ________ key is used to change lowercase letters mode to uppercase and vice versa.
(A) Alt (B) Enter
(C) Ctrl (D) Caps Lock✓

16. Computer is a combination of:
(A) Software
(B) Hardware
(C) Both (a) and (b)✓
(D) None

17. ________ is not a hardware component.
(A) Input device
(B) Secondary storage
(C) Processor
(D) Operating system✓

18. Another name of main memory is:
(A) Secondary memory
(B) Primary storage✓
(C) Permanent memory
(D) None

19. A set of instructions in a computer is:
(A) Software (B) Program
(C) Hardware (D) Both (a) and (b)✓

20. A program or set of programs that is specially designed to control the computer system is called:
(A) System Software✓
(B) Application Software
(C) Freeware
(D) Shareware

21. ________ key is used to cancel the current operation.
(A) Alt (B) Caps Lock
(C) Esc✓ (D) Num Lock

22. Arrow keys are also known as:
(A) Function keys
(B) Cursor Control keys✓
(C) Toggle keys
(D) Special keys

23. ________ input device is not a pointing device.
(A) Scanner✓ (B) Pointing stick
(C) Digitizing tablet (D) Touchpad

24. ________ pointing devices has a vertical handle like a gearshift lever.
(A) Light pen (B) Pointing stick
(C) Trackball (D) Joystick✓

25. ________ pointing device uses the sensors to detect the touch of a finger.
(A) Touchscreen✓ (B) Light pen
(C) Pointing stick (D) Joystick

26. Imaging uses what device to input data.
(A) Tablet (B) Icon
(C) Barcode reader (D) Scanner✓

27. The barcode is called:
(A) Universal Product Code✓
(B) EBCDIC code
(C) ASCII code
(D) Unicode

28. ______ is a photoelectric scanner that translates the barcode symbols into digital code.
(A) MICR (B) Barcode Reader✓
(C) OCR (D) OMR

29. ______ devices is used check and process the test marks of students:
(A) OMR✓
(B) Barcode Reader
(C) An example of smart card
(D) MICR

30. ______ is an audio input device.
(A) Digital camera (B) Microphone✓
(C) Video camera (D) Speaker

31. ______ is an output device.
(A) Monitor (B) Speaker
(C) Printer (D) All✓

32. Printers and monitors are examples of:
(A) Input unit (B) Storage unit
(C) Output unit✓ (D) Processing unit

33. ______ is not to related softcopy output.
(A) CRT (B) Plotter, printer✓
(C) Monitor (D) Screen

34. ______ works like a photocopying machine.
(A) Inkjet printer (B) Bubble printer
(C) Laser printer (D) Band printer

35. An Inkjet printer is an example of a(n):
(A) Laser printer
(B) Impact printer
(C) COM printer
(D) Non-impact printer✓

36. ______ is not an output device.
(A) Monitor
(B) Plotter
(C) Speaker
(D) Scanner✓

37. How many types of graphic cards are used?
(A) 2 (B) 3✓
(C) 4 (D) 5

38. The monitor having VGA cards has resolution:
(A) 1024 × 768 pixels
(B) 800 × 600 pixels
(C) 640 × 570 pixels
(D) 320 × 200 pixels✓

39. ______ is/are the characteristic(s) of display screen.
(A) Resolution (B) Size
(C) Color (D) All✓

40. ______ is an impact printer.
(A) Dot matrix printer
(B) Daisy wheel printer
(C) Line printer
(D) All✓

41. ______ print head of dot matrix printer provides best quality printout.
(A) 24 pins✓ (B) 18 pins
(C) 9 pins (D) 20 pins

42. The printer which can print one character at a time is:
(A) Dot matrix printer
(B) Daisy wheel printer
(C) Laser printer
(D) Both a & b✓

43. DPI stands for:
(A) Data Per Inch
(B) Digit Per Inch
(C) Dots Per Inch✓
(D) None

44. ______ output device is used to print continuous output such as to track an earthquake reading.
(A) Flatbed plotter
(B) Dot matrix printer
(C) Drum plotter✓
(D) Line printer

45. Bit stands for:
(A) Binary digit✓ (B) Binary integer
(C) Basic digit (D) None

Microsoft Office

1. Program which helps to create written document and lets you go back and make corrections as necessary:
(A) Home row keys
(B) Toolbar
(C) Folder
(D) Word processor✓

2. Graphics for word processor:
(A) Peripheral
(B) Clip art✓
(C) Highlight
(D) Execute

3. What type of software is used for creating letters, papers and other documents?
(A) Database
(B) Word Processor✓
(C) Spreadsheet
(D) Operating Program

4. What does the Ctrl + I shortcut key accomplish in MS-Word?
(A) It converts selected text into the next larger size of same font
(B) It adds a line break to the document
(C) It makes the selected text bold
(D) It applies Italic formatting in the selected text✓

5. What is the file extension of MS-Word document?
(A) Dot (B) Doc✓
(C) Dom (D) Txt

6. In H_2O, the figure 2 is appeared lowered. Which effect has been applied?
(A) Superscript (B) Lowered
(C) Subscript✓ (D) Laid down

7. **Why are headers and footers used in document?**
(A) To enhance the overall appearance of the document
(B) To mark the starting and ending of a page
(C) To make large document more readable
(D) To allow page headers and footers to appear on document when it is printed✓

8. **Which of the following shortcut key is used to check spelling?**
(A) F1 (B) F2
(C) F7✓ (D) F9

9. **What does Ctrl + B shortcut accomplish in MS-Word?**
(A) It converts selected text into the next larger size of the same font
(B) It adds a line break to the document
(C) **It makes the selected text bold✓**
(D) It applies Italic formatting in the selected text

10. **Synonyms are words with an opposite meaning, such as "cheerful" and "sad."**
(A) True
(B) False✓

11. **To make editing easier, you can use the Find and Replace feature to find text in a document and replace it with other text as directed.**
(A) True✓
(B) False

12. **A First Line Indent indents all lines after the first line of the paragraph.**
(A) True
(B) False✓

13. **The default line spacing for a Word 2007 document is set to multiple with a 15% increase (1.15) over single spacing.**
(A) True✓
(B) False

14. **Word can quickly sort text, numbers, graphics, or data in lists or tables in alphabetical, numeric, or date order based on the first character in each paragraph.**
(A) True
(B) False✓

15. **The Office Clipboard can store up to __ items that have been cut or copied.**
(A) 10 (B) 12
(C) 24✓ (D) 50

16. **A ______ marks the point at which one page ends and another begins.**
(A) Page break✓
(B) Column break
(C) Cell break
(D) Line break

17. **Field codes appear between ______ called braces.**
(A) [] (B) ()
(C) <> (D) {}✓

18. **The vertical space between lines of text is referred to as what?**
(A) Indenting
(B) Line spacing✓
(C) Paragraph padding
(D) Internal margins

19. **An outline numbered list can have up to this many levels.**
(A) 5
(B) 8
(C) 9✓
(D) 15

20. **To get help using Word, click the help icon on the ribbon or press the F1 key.**
(A) True✓
(B) False

21. **To open an existing document, access the open command by clicking the ______, which displays the ______.**
(A) Office Button; File Menu✓
(B) Quick Access Toolbar; Open button
(C) Insert Tab; Open Group

22. **The first time you save a document you must name the file.**
(A) True✓
(B) False

23. **When you type new text, ______ mode replaces existing text.**
(A) Insert (B) AutoType
(C) Overtype✓ (D) Replacement

24. **You can use Undo to reverse more than one change.**
(A) True✓ (B) False

25. **After selecting text, use the ______ and ______ commands to move the text to a different location.**
(A) Copy; Paste (B) Cut; Paste✓
(C) Cut; Repeat
(D) Copy; Paste Special

26. **You can add a tab stop just clicking a location on the Word ruler.**
(A) True✓
(B) False

27. **To reduce the amount of space on the right side of document, you can ______ the ______.**
(A) Increase; Left Margin
(B) **Decrease; Right Margin✓**
(C) Decrease; Left Indent
(D) Increase; Right Indent

28. **You can format a document to contain the maximum of 3 newsletter columns.**
(A) True
(B) False✓

29. **To apply a multilevel Outline Number style to document, the paragraphs must be:**
(A) Indented✓
(B) Formatted
(C) Numbered
(D) Bulleted

30. **The Clip-Art Gallery consist of pictures that come with Word, as well as pictures available on Microsoft Office Online.**
(A) True✓
(B) False

31. **To access a Dictionary, Thesaurus and**

translation options all at once open the task pane.

(A) Research
(B) Clipboard
(C) Spelling and Grammar✓
(D) Document Information

32. A quick way to change all the instances of the word beautiful with the word picturesque is to use the ________ feature.

(A) Thesaurus
(B) Find and Replace
(C) Document Information✓
(D) Properties

33. What does the green wavy line under the word or phrase in the document mean?

(A) The word or phrase might be misspelled
(B) The word or phrase has been copied to the clipboard
(C) The word or phrase might contain a grammatical error✓

34. To create a hyperlink to another document, you need to select the item to represent the link and then:

(A) Format the item using the Hyperlink style
(B) Enter the destination using the Insert Hyperlink dialog box✓
(C) Type the destination using the Hyperlink tag

35. When using a document using Print Preview, you can zoom into the document, edit the document, and make layout changes.

(A) True✓
(B) False

36. To control how a document is printed, open the Print dialog box using the command on the Office menu's Print submenu.

(A) Quick Print
(B) Print✓
(C) Page Setup

37. To use your keyboard instead of the mouse to select tools on the ribbon, you display the Key Tips by pressing the ________ key.

(A) Alt✓
(B) Ctrl
(C) Shift + Enter
(D) Alt + Enter

38. To display a document so it looks like pages in a book, switch to ________ view.

(A) Draft
(B) Web Layout
(C) Print Layout✓
(D) Full Screen Reading

39. How do you close a Word document without closing the Word Window?

(A) Click the Close button on the title bar
(B) Click the Minimize button on the title bar
(C) Click the Close command on the Office Menu✓
(D) Click the Exit Word on the File Menu

40. A feature of MS Word that saves the document automatically after certain interval is available on:

(A) Save tab on Office Button, Word Options dialog box✓
(B) Save As dialog box
(C) Both of above
(D) None of above

41. Where can you find the horizontal split bar on MS Word screen?

(A) On the left of horizontal scroll bar
(B) On the right of horizontal scroll bar✓
(C) On the top of vertical scroll bar
(D) On the bottom of vertical scroll bar

42. Which of the following is not available on the Ruler of MS Word screen?

(A) Tab stop box
(B) Left Indent
(C) Right Indent
(D) Center Indent
(E) All of them are available on ruler✓

43. Pressing F8 key for three times selects:

(A) A word
(B) A sentence
(C) A paragraph✓
(D) Entire document

44. What happens if you press Ctrl + Shift + F8?

(A) It activates extended selection
(B) It activates the rectangular selection✓
(C) It selects the paragraph on which the insertion line is
(D) None of above

45. How can you disable extended selection mode?

(A) Press F8 again to disable
(B) Press Del to disable
(C) Press Esc to disable✓
(D) Press Enter to disable

46. What is the maximum number of lines you can set for a drop cap?

(A) 3
(B) 10✓
(C) 15
(D) 20

47. What is the default number of lines to drop for drop cap?

(A) 3✓
(B) 10
(C) 15
(D) 20

48. What is the shortcut key you can press to create a copyright symbol?

(A) Alt+Ctrl+C✓
(B) Alt+C
(C) Ctrl+C
(D) Ctrl+Shift+C

49. How many columns can you insert in a word document in maximum?

(A) 35
(B) 45✓
(C) 55
(D) 65

50. What is the smallest and largest font size available in Font Size tool on formatting toolbar?

(A) 8 and 72✓
(B) 8 and 64
(C) 12 and 72
(D) None of above